# THE IRON AGE

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## Towing Ore on Upper Mississippi

EDWARD F. GOLTRA

TOWING iron ore on a large scale in the upper Mississippi River was begun a few days ago at St. Paul. Important not merely because it represents a case of increased utilization of water transportation, the fact also emphasizes a likely movement to secure efficient utilization of river craft, as the barges taking iron ore away arrived at St. Paul from St. Louis with coal. The lower of the accompanying pictures shows six steel barges carrying 3000 tons of coal, said to be the largest cargo ever hauled to the head of navigation on the Mississippi. The upper picture shows a tow of 10 barges containing 3600 tons of iron ore consigned to the Mississippi Valley Iron Co., at St. Louis, of which Edward F. Goltra is president. It is understood that this is the first iron ore to leave Minnesota, at least in any volume, for points south by the Mississippi River route. The Mississippi Valley Iron Co. rehabilitated in 1916 the Missouri furnace at St. Louis, and while it had ore properties in southeastern and southwestern Missouri, and its principal supply of ore lay in the vicinity of Waukon, Iowa, it had as a reserve about 100,000 tons in the Baraboo and Mesaba ranges.

# National Labor Conditions Considered

## Conference of Manufacturers and Secretary Baker Aims to Prevent Strikes—Powers of Present Commission May Be Enlarged

WASHINGTON, Sept. 11.—A conference on the national labor situation of far-reaching importance to the industries of the country and especially to those engaged in the production of war munitions, was held here on Sept. 6 at the headquarters of the Council of National Defense, the participants being the Secretary of War, as chairman of the council; several officials of the Advisory Commission, and a committee of five appointed by the National Industrial Conference Board composed of L. A. Osborne, vice-president Westinghouse Electric & Mfg. Co., New York; W. H. Barr, president Lumen Bearing Co., Buffalo; W. H. Van Dervoort, president Root & Van Dervoort Engine Co., East Moline, Ill.; C. A. Crocker, president Crocker-McElwain Co., Holyoke, Mass., and E. A. Smythe, president Pelzer Mfg. Co., Greenville, S. C. The object of the conference, which was sought by the committee of the National Industrial Conference Board, was to lay before the Council of National Defense certain facts in connection with the present disturbed labor situation and to urge that steps be taken to secure a better understanding with the national labor organizations for the purpose of bringing about a definite, practical and assured method of securing an uninterrupted maximum output so essential to the successful conduct of the war.

The National Industrial Conference Board is a cooperative and advisory body of representative manufacturers constituted through the selection of two members of each of the following national associations: National Founders' Association, National Metal Trades Association, National Erectors' Association, National Association of Manufacturers, National Automobile Chamber of Commerce, American Cotton Manufacturers' Association, National Association of Cotton Manufacturers, National Association of Wool Manufacturers, American Paper and Pulp Association, Electrical Manufacturers' Club, Manufacturing Chemists' Association of the United States, National Boot and Shoe Manufacturers' Association, Rubber Association of America, Silk Association of America, United Typothetae and Franklin Clubs of America, and the National Council for Industrial Defense.

### Would Maintain the Status Quo

In the statement presented to the Council of National Defense, the committee quoted the declarations of the council's Committee on Labor, substantially directed and controlled by representatives of the largest national unions, emphasizing the statement so widely promulgated that "neither employers nor employees shall endeavor to take advantage of the country's necessities to change existing standards." In spite of these declarations, the committee declared, the country is now entering the fifth month of the war faced with unprecedented demands for war production, seriously interrupted and delayed by numerous strikes and threats of strikes in every part of the country, some of which are likely to assume the proportions of a national interruption of essential service in our factories and shipyards.

"Let it be clearly understood," said Chairman Osborne in addressing the council, "that we, without equivocation, endorse the maintenance of every necessary regulation for safety and health and the fair adjustment of wages in accordance with the American standard of living and the increasing cost of its maintenance.

"We also submit that the Naval Consulting Board, reporting upon its preliminary investigation of manufacturing establishments capable of munition work, found the total number to be 18,654, and that of these 16,787, or 89 per cent, were 'open' shops. Of 1,950 establishments usable for the manufacture of ammunition, powder and explosives, guns and gun material, gun carriages, limbers and accessories, personal military equipment, tools, gages and punches, machine tools and aeroplanes, all but 73 are 'open' shops.

"With respect to wages, a great body of munition production for the government proceeds under a contract wage law, assuring at least time and a half for all overtime in excess of eight hours, so that for like tasks industrial wages for war work are universally increased by the operation of statute in every plant whose contracts come within its scope. Antecedent to our entrance into the war general wage increases in large amounts had been voluntarily given throughout the generally prosperous industries, so that it may be fairly said that our wage scale on the average was, actually as well as nominally, greatly superior to that of any belligerent country. But despite this condition and the increase by statute of wages for the subject matter of our own war production, it is inevitable that wage differences will continue to arise. The vital thing is that such disputes shall be adjusted without interruption of production necessary to national defense. To this end we believe that manufacturers are ready and anxious to co-operate in the establishment of a representative and equitable system of adjustment *for the period of the war.*

### Strikes Threatened

"There are, however, other 'standards' of employment than those relating to hours and wages which are of critical importance, not merely to efficient production, but to the institutions of a free people. Strikes are threatened and are occurring in increasing numbers to compel the exclusive employment of union men. This, we emphatically urge, is contrary to any fair interpretation of the spirit and letter of the fundamental policy declared by the council *'that employers and employees in private industries should not attempt to change the standards which they were unable to change under normal conditions.'*

"Can there be any doubt that to undertake to open a 'closed' shop or close an 'open' shop under the exigencies of war is an evident attempt to *'change the standard which they were unable to change under normal conditions'?"*

Continuing, Mr. Osborne emphasized the fact that today there is a labor shortage which necessarily will be intensified by withdrawing from industry the personnel of its contribution to our armed forces. "In this crisis," he said, "America needs the service of every citizen. We can no more depend upon one class to operate our factories than to fill the ranks of our armies. Therefore it is inconceivable that the Government can tolerate much less approve, any proposal which makes membership in a private organization a prerequisite to a citizen securing employment in production for the war.

"To win this war we can sacrifice everything but the principles of the Republic and the fundamental rights of citizenship it was founded to protect. The right to pursue a lawful calling and to live free from annoyance and molestation is the primary, if not the greatest, privilege which society is founded to sustain.

"The British policy expressed in its munition acts is that all labor, whether it be that of the employer or the employee, of men or women, of union or non-union, of the skilled or unskilled, shall be employed to the best advantage to the country. Neither restriction nor discrimination, nor, in 'controlled shops,' strikes or lockouts are permitted."

### Needs of War Times

Summarizing its conclusions, the committee urged that, as a basis of mutual understanding, employer and

employee recognize and agree that now and for the period of the war continuous efficient production can alone equip and sustain our military forces; that the council adopt the fundamental doctrine authoritatively stated by the Anthracite Coal Strike Commission, with the approval of representatives of both employers and unions, "that no person shall be refused employment or in any way discriminated against on account of membership or non-membership in any labor organization; and that there shall be no discrimination against, or interference with, any employee who is not a member of any labor organization by members of such organization." To this end the committee laid before the council the following definite recommendations:

(a) That applied to existing statutory regulations intended to promote safety and health, it shall be agreed that for the period of the war there shall be no suspension or modification of such provisions, except upon recommendation of the Council of National Defense after due investigation by its agencies and when, in its judgment, required by the exigencies of war;

(b) Applied to wages, demands shall be tested by the prevailing local standard of the establishment in effect at the beginning of the war with such modification as may be shown to be necessary to meet any demonstrated advance in the cost of living.

(c) Applied to hours, the standard shall be those established by statute or prevailing in the establishment at the beginning of the war subject to change only when in the opinion of the Council of Defense it is necessary to meet the requirements of the Government.

(d) Applied to what are commonly known as "open" or "closed" shop conditions, it shall be understood and agreed that every employer entering the period of the war with a union shop shall not by a lockout or other means undertake to alter such conditions for the duration of the war, nor shall any combination of workmen undertake during the like period to "close" an "open" shop.

### Proposed Federal Board

Adopting these standards as the basis of its operations, the committee recommended the creation of a federal board to adjust labor disputes for the duration of the war, its activities to be confined to disagreements growing out of employment on the subject matter of war production for the government. The board would be constituted equally of representatives of employees, employers and the government, the representatives of the latter to have a deciding voice in the event of an equal division of opinion. Pending decisions of the board, no interruption of production by strike, lockout or other means will be permitted.

The committee pledged the acceptance of its program by the great body of representative associations and individual manufacturers of the country and urged that a conference of representative national and international officers of American trade unions be called on behalf of the workers of the country to join in the pledge.

Secretary Baker, in his capacity as chairman of the Council of National Defense, gave close attention to the statement presented by the committee and promised that it should have very careful consideration. It is pointed out by the council that it will be practicable to meet the suggestions presented by the committee with respect to the establishment of a joint adjustment commission by enlarging somewhat the functions of the commission which the council recently decided to create to handle all labor disputes arising in establishments doing war work for the government. W. L. C.

## Analyzing Ferrosilicon Without a Platinum Crucible

It is possible to dispense with expensive platinum crucibles in analyzing ferrosilicon, according to Dr. Herwig in an article in *Stahl und Eisen*. According to a translation in the London *Iron and Coal Trades Review*, iron crucibles can be used if instead of the usual carbonate of soda and potash method sodium dioxide is used in the ignition mixture. Great care must be taken to reduce the ferrosilicon to as fine a powder as possible, to remove all coarse particles and to mix the powdered silicon thoroughly and very uniformly with the dioxide, as otherwise dangerous ebullition might take place, which would nearly empty the crucible and the spattering endanger the analyst's eyes. The author gives a comparative list of 22 analyses made, one-half of these by the sulphate, the other half by the dioxide method, of ferrosilicons, ranging in silicon content between 10.75 and 90.78 per cent. The differences in the results obtained by the two methods range only between, say, plus 0.05 and minus 0.13 per cent.

## A New Tractor

A new tractor, for which the impetus of war requirements is undoubtedly to be given the credit, has been built by the Cleveland Tractor Co., Cleveland, from the designs of R. H. White, of the White motor truck industry. An idea of its proportions and construction may be gained from the accompanying reproduction of a photograph showing the tractor making tests for officers of the Ohio regiment of engineers. The tractor develops 20 hp. at the pulley, shown at the front, and 12 hp. at the draw bar. It is not over 50 in. in width and is 52 in. high and weighs 2750 lb. Its traction surface measures 600 sq. in., a fact which, it is emphasized, allows it to travel over practically any surface without slipping.

Cleveland Tractor Hauling a 5700-lb. Gross Load Across a Creek Bottom

# Broader Scope for Vocational Training

## Larger Activities of the National Association of Corporation Schools in Behalf of Less Skilled Employees

BY PAUL KREUZPOINTNER

The increasing demand from our industries for not only a more intense but a more adequate form of elementary, high school and vocational education and the discussion of the subject in various trade journals are significant and encouraging. The conviction is growing that the purely mechanical dexterity training in the manipulation of tools as a means for speeding up and increasing output is no longer sufficient for the skilled mechanic.

As a matter of fact, in the haste for output and in the desire to meet competition, too much emphasis was laid upon the training of those habits and inclinations, like inventive expression and manual dexterity, which are already more or less secondary habits with our people and largely cultivated faculties, the development of other valuable faculties which were dormant was neglected and their value lost to the pupil, to industry and to the community.

Our pioneer life demanded mechanical ingenuity and manual dexterity as an asset to national development, producing the "jack of all trades" who still flourished largely during the sixties and whose inherited capacities formed a valuable basis for the phenomenally successful development of our mechanical industries. With the liberal application of technology to our machine industry in the seventies and its extension into mining, manufacture, transportation, agriculture and household activities came the demand for its recognition in the schools, with their traditional emphasis on the cultural aspect of education.

### Industrial Viewpoint too Narrow

The craze for the cultivation of manual dexterity for the sake of output reacted adversely upon the industries in several directions. It alienated educators from the efforts of industrialism to maintain that standard of civilization conceived to be essential to secure the continued prosperity of the industries and commerce. Thus antagonism and distrust were engendered between two powerful social forces, each misunderstanding the point of view of the other, where cooperation of all social forces was essential to progress in the material and ethical life of the nation.

The mass of workers in shop, store and office are citizens and voters, and through sheer force of numbers they shape the destiny of communities and the nation. In their over-emphasis of purely manual dexterity and the manipulation of tools, together with the effects of scientific management, there was danger of losing that mental vision and grasp of civic and social life and its responsibility without which orderly government cannot be carried on for any length of time. We cannot divorce the industrial worker and his vocational duties from the man and citizen and his moral and civic duties.

If the worker does not comprehend why he should be a good citizen, he will likewise be unable to comprehend why he should do good and faithful work for the money paid him, or why he should work at all. But if the employee is reduced to a mere machine-tending automaton by his specialized work, or by a scientific management which develops only one useful faculty at the expense of the others, or by an autocratic business regime which leaves no room for initiative, then the inevitable reaction stimulated by our free institutions will produce unrest, misuse of liberty and an exaggerated, undefined worship of human rights with a minimum of responsibility.

### Welfare Work to Bridge the Gap

Within the shop gate or the office the employee is necessarily subject to a regimen in respect to his mental and physical powers, and often his sense of loyalty to his employer restrains the exercise of his will even outside of the shop gate or office. What wonder if there is a mental reaction resulting in an intense desire for unrestrained liberty of action outside the shop, encouraged by democratic institutions in the shaping of which the employee as a citizen has much to say. It is obvious that these conditions are liable to produce antagonism, which is tempered only by the necessity of earning a living. The problem is complicated by the shifting of conditions in the industries, requiring new methods of management and increased efficiency, as well as by social, economic and political changes of national extent.

Of late numerous attempts have been made by individual industries to minimize these antagonisms by welfare arrangements, often of a very elaborate kind, and by pension systems. These are well meaning and praiseworthy, and sometimes react favorably upon the ethical life of the community. Sometimes, if the method of carrying on this welfare work is not well chosen, it assumes a paternalistic character, arouses suspicion, creates an undercurrent of ill will and does more harm than good in the long run, not only to the particular concern, but to the community as well.

### Broader Policy in Industrial Causes

It is encouraging to see the growth among industrial and commercial corporations of the conviction that the man working for a living, the moral man who seeks to do his work right, and the conscientious citizen who must support the institutions which hold society together and vouchsafe industrial and commercial stability, are one and the same person in daily life. In recognition of this fact and with commendable foresight, the National Association of Corporation Schools has broadened its apprentice school training by the addition of such subjects as will develop right economic views and a sense of civic responsibility, enlarging its work by adding a department of continuation schools for the semi-skilled and unskilled. The satisfactory results attained thus far in trade schools for skilled mechanics as well as in corporation and public continuation schools would indicate that it not only pays from the commercial standpoint, but also tends to raise the civic standard of the community. The reason is not far to seek. How can we maintain our institutions and our industrial progress if we allow millions of the population to sink into the mental slough of machine-tending automatons whose only means of reviving their drooping spirits is in demoralizing recreation?

The next question is, What can the industries do, for their own good, to minimize or counteract these deteriorating social forces? An elementary treatment of natural science subjects as related to the technical side of industrial or commercial occupations, or of the problems of municipal management, state and national government, offers a field for educational extension in various directions. The extent, location and characteristics of the raw materials forming the basis of the industry in which the employees are engaged would form an interesting field of study in the shop apprentice schools as well as in the shop continuation schools for the unskilled and semi-skilled. The means of transportation of these raw materials, the processes of their conversion and the properties and uses of the resulting product would open another large field not only for occupational study but for recreation and even entertainment if these subjects are linked up with history, geography and travel in narrative form. The shop apprentice and shop continuation schools have the advantage over the technical high school and the public

continuation or part time school, of direct application of the subjects taught. Such courses would make plain to apprentices the reason for the insistent emphasis on economy of time and material in daily operation, reducing the need of supervision and coercion and removing a great source of antagonism and misunderstanding between employer and employee.

### Community Aspects

Most of the wasteful, slipshod, unbusinesslike management of municipal affairs can be traced directly to lack of training of the average taxpayer in technical and economic subjects. Problems of municipal government are largely engineering problems nowadays, requiring expert knowledge for their economic solution. Where every citizen has the right to decide what is best for the city and for the country, he assumes that this right also enables him to judge what is best, and the average taxpayer therefore has no use for the expert.

Those who have had the opportunity to watch the technical and economic growth of our industries during the past fifty years have also observed the growth of differences between employer and employee. The conclusion is inevitable that the financial and technical demands upon industry have grown much faster than the supply of knowledge on the economic and social significance of industrial developments. It was assumed that there was no relation between the shop life of the workman and his civic life outside the shop, and in vocational education the emphasis was all directed to purely manual dexterity training and quantity of output. Much can be done in broadening vocational training, where shop schools and shop continuation schools have already been established, and by establishing such schools in industrial concerns where there are none as yet.

### Co-operation With Public Schools

To raise the standard of vocational education in the shop as well as in the public vocational and continuation schools, it is desirable for the industries to cooperate with the public school system, but not to try to dominate the latter or push it to one side. Civics, natural resources, history and geography ought to be correlated with technical-mechanical subjects with great advantage to the employee, the employer and the community. Every large concern should have a museum of raw, semi-finished and finished materials, or if this is not feasible there should be such a museum connected with the public schools or the public library. A well selected library, stereopticon slides, moving pictures and lectures on special trade and industrial topics, and entertainments can be made valuable auxiliaries of trade and continuation schools in the shop or outside of it.

In all vocational education the inductive and objective method of teaching is preferable. It develops judgment, interest, reasoning, economic scrutiny, accuracy, and a sense of responsibility and is cultural, while directly appealing to the personal interests of the pupil. The industries will need this form of vocational education even more after the war than now.

## Analysis of Aluminum and Its Alloys

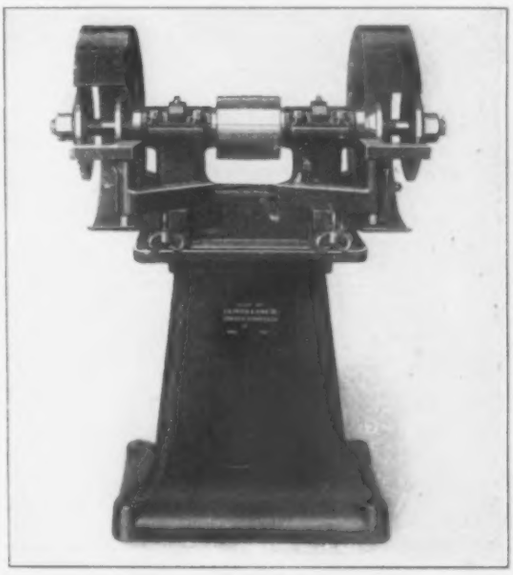
The importance of the analysis of aluminum and its alloys has been enhanced decidedly because of the rapid increase in their use, according to J. H. Stausbie of the Birmingham (England) Technical School in a paper on the "Analysis of Aluminum Alloys" read before the Society of Chemical Industry (British). For works purposes the methods of the investigator take up too much time, and shorter though less accurate ones must be used. An analysis which gives the content of a constituent to within 0.1 per cent, or even less in some cases, is sufficiently accurate for the manufacturer, as he could not hope to get within closer limits in making an alloy from a given formula. If the alloy is supplied in bulk, samples obtained by means of a moderately fine metal saw give good results. Turnings, drillings or borings are not so convenient. The author gave various methods of analysis, including one for the determination of nickel in aluminum alloys, which is giving very fair results.

## Double-Spindle 18-in. Grinding Machine

A line of double-spindle grinding machines equipped with self-oiling, babbitted bearings has been developed by the S. B. Patch & Sons Co., Streator, Ill. The machines are built in three sizes for mounting wheels having diameters of 10, 14 and 18 in. respectively. The general design of the three sizes is the same as the largest which is illustrated herewith.

The spindles are of steel which is finished by turning and grinding and are interchangeable for the same size of machine. The diameter, it is emphasized, is larger than usual to avoid any likelihood of spring. The bearings are babbitted and are reamed for alignment. They are self-oiling and the caps are milled to lock on the boxes and thus provide a uniform bearing. With a view to preventing dust from entering the bearings, liners are placed between the bearings and the caps, this arrangement also being relied upon to permit adjustments for wear.

Wheel flanges and cast-iron wheel guards are employed to insure safety if a wheel should by any chance burst in use. The rest supports and the rest holders



A Slightly Different Arrangement of Rest Supports and Holders Is Employed in a Recent Double Spindle Grinding Machine Mounting Wheels 18 In. in Diameter with a 3-In. Face

are finished by milling, as well as the bottom of the head and the plate where they come in contact. This has been done in an effort to make the machine as chatter-proof as possible. This finishing of the parts has been supplemented by providing a heavy base which covers a large amount of floor space.

The wheels used by the machine illustrated are 18 in. in diameter with a 3-in. face, and the distance between them is 24 in. The spindle is 1½ in. in diameter where it passes through the wheel and 1¾ in. in the bearings, which are 6 in. long. The center of the spindle is 35 in. from the floor and 11 in. above the machine table. The weight of a complete machine is 500 lb. and the speed of operation is 500 r.p.m. If desired, special safety flanges 10 in. in diameter can be supplied in place of the wheel flanges that are regularly furnished.

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The LaBelle Iron Works, Steubenville, Ohio, which recently bought about 2500 acres of coal lands in Ohio and Brooke County, W. Va., states that the property is intended as a steam coal reserve, and that it has no plans at present for the development of this field.

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An illustrated pamphlet on hitches and slings, covering the use of ropes, cables and chains, has been issued by the National Safety Council, Chicago, as No. 6 of its series of pamphlets on "Safe Practices."

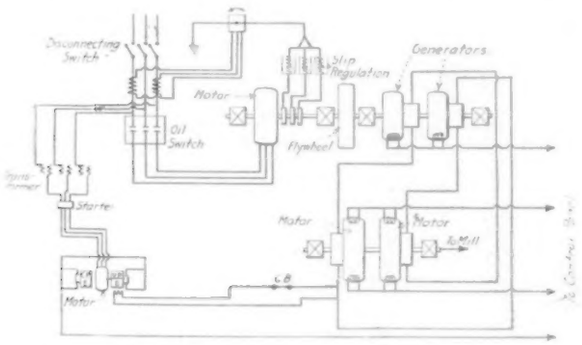
# Means to Economy from Motor-Driven Mills

## Elements in the Design of a Reversing Rolling Mill Which Make for Reliability and Efficiency and Lower Operating Costs

BY D. M. PETTY*

POSSIBLE improvements in the electric drive of reversing rolling mills and means of keeping at a minimum the cost of rolling steel using this drive are of immediate interest. Three items, cost of equipment, efficiency and reliability enter into the cost of rolling and are affected by the drive.

An excellent means of reducing the cost of the equipment per ton of steel rolled is to increase production, but mechanisms that do not in some way decrease the cost per ton of steel rolled should not be installed. Refinements which make the drive more efficient and do not hinder operation will reduce the number of kilo-




The flywheel of the motor-generator set in the Ilgner system is usually placed between the induction motor and the direct-current generator. When two generators are used, the maximum potential to ground may be kept equal to that of one generator by connecting them in series as shown

watt hours per ton and also the size, and hence the cost of the drive. They will also reduce the capacity required in the power station. Delays keep the rolling costs up as much as any other factor in mill operation, and so all machinery entering into a mill drive should be thoroughly reliable. It must be designed so that trouble can be easily found and quickly repaired. This means it must be as simple as possible.

A study of the drive by following the flow of energy from the power mains to the mill as shown in the illustration will indicate the elements of reliability, efficiency and cost of each part.

### The Motor-Generator Set

Passing from the disconnecting switches to the oil switch and primary windings of the motor, there is little in this link that needs comment, except as to reliability. It is a grave mistake to install any apparatus in this link that is not fully up to the standards of the rest of the equipment. The oil switch should be of sufficient capacity to handle a short circuit without throwing oil over other parts of the equipment.

The primary windings of the driving motor, which is assumed to be a high voltage induction motor, should not only be liberally rated to keep up its efficiency, but its insulation should withstand high temperatures and moisture. The bearings and shaft should be liberally rated and designed for ring oiling, but gravity oil feed should be provided to insure against letting the rotor down on the stator iron.

It is common practice in this country to locate the flywheel between the driving motor and the generators, letting the flywheel bearings serve as one bearing for the motor and one for the generator. If the flywheel is located on the opposite end of the generators from the motor and is carried in a separate pair of bearings with a flexible coupling, wear of the flywheel bearings will not affect the operation of either the generators or the motor. This would be an especially good arrangement if two motors and two sets of generators were used in connection with one flywheel. The flywheel should be designed with a high factor of safety, machined to insure good balance and the rim should be protected with a shield to reduce air friction.

### The Direct-Current Generators

The direct-current generators are usually built for 600 volts or more and are not only equipped with interpoles, but also with compensating windings in the main pole faces. The commutators should be very liberally designed and have extra wearing depth of bars. Extra length of creepage distance should be provided on each end of the commutators to prevent flashover to ground. The commutators of the generators are one of the weakest points in the entire system and too much care cannot be taken to make them right. The brushes should be of the highest quality and contain no abrasive material and the mica should be kept undercut. The current density in the brushes should be kept low and shunts should have ample current carrying capacity. What is true of the generator commutators is also true of the mill motors.

The motors must be ventilated by a forced draft. The air should be washed unless it is taken from outside the mill and is free from the usual dust and gases of a rolling mill. Also it must be properly distributed through the motors to avoid hot spots in the windings.

When two or more generators are used they should be connected in series as shown in the illustration, as this connection keeps the voltage to ground equal to that of one generator.

### Compound versus Shunt Wound Motors

There is some question as to whether the motors should be compound or shunt wound. A compound winding on the motor gives it somewhat of a cushion against severe overloads and to a certain extent protects not only the motor but also the machinery of the mill. It also tends to increase the torque of the mill motor for a given armature current, but this is not very much at slow speeds where maximum torque is needed. The shunt field windings are then at their maximum excitation and additional excitation produced by the series windings does not produce a proportionate amount of field flux. When the field has been weakened to give high speeds the compounding will be more effective but then the motor should not slow down, for high speeds are desired. A compound wound motor can have a lower horsepower rating to handle a given peak load but it does this at the expense of production. A shunt wound motor to handle the same peak loads would be larger than the compound wound motor and will give greater production. The generators for the shunt motor will be larger than for the compound wound motor which further increases the cost of the equipment over that of the compound motor.

The compounding of the mill motor is usually accomplished by having a variable potential exciter for the field current the voltage of which varies with the load current of the mill motor. This arrangement is necessary because the series field of the motor must be in the same direction for both directions of rotation and since the load current reverses each time the motor reverses, the connections of variable potential exciter to the motor fields must be reversed with each reversal of the mill. This can and is easily taken care

*From a paper read before the Association of Iron and Steel Electrical Engineers at Philadelphia, Sept. 11. The author is superintendent, electrical department, Bethlehem Steel Co., South Bethlehem, Pa.

of in the master controller. Omitting the compound field, however, tends to simplify the master controller and this is a desirable feature as simplicity insures continuity of operation. It would seem therefore that a shunt wound motor should be used unless the mill is to be a slow one or one subject to severe peak loads at frequent intervals. The time of reversal of the motor has been brought up in comparing it with the steam engine and it is admitted that the engine can reverse quicker, but this is not the most important point to be considered in selecting the drive for a mill. Steel must be entered in the rolls at low speed and the motor must be capable of accelerating quickly with the piece in the rolls.

### Mill-Motor Bearings

The bearings of the motor must be provided with constant oil feed because the rings will not carry oil when running on a shaft which changes its direction of rotation often. The bearing pedestal next to the mill must be designed to stand the thrust of a broken spindle and provided with a thrust bearing. These bearings are also provided with cooling coils but if possible the mill should run without this feature.

The exciter set is a small item in the first cost but a necessary link in the chain, and must therefore be liberally rated. A spare should be provided if the mill is laid out for continuous operation.

The coal contactors should be designed for hard service and installed so as to facilitate repairs. The controller by which the engineer operates the mill should be made as fool proof and simple as possible, and too much care cannot be used in the makeup and design of this piece of apparatus. Terminal boards plainly marked should be used at both ends of all control circuits. This is especially good practice when the wires are grouped together in one conduit.

### Mill of Bethlehem Steel Co.

The following is the data of the drive in the No. 2 mill of Bethlehem Steel Co., South Bethlehem:

35-in. blooming mill.
Speed full motor field, 40 r.p.m.
Speed weakened motor field—120 r.p.m.
Voltage across each armature—600.
Maximum operating torque—1,550,000 lb. ft.
Maximum motor hp.—12,000.
Rated capacity of motor generator set—2000 kw.
Weight of flywheel—100,000 lb.
Synchronous speed of motor generator set—375 r.p.m.
Average for one month—21.3 kw-hr. per ton.
(Rolling equal quantities of 4 in. x 4 in. and 9 in. x 9 in. blooms from 23 in. x 27 in. ingots, 0.40 to 0.50 per cent carbon.)
Best record, 12 hr.—19.41 kw-hr. per ton.
(Rolling 8 in. x 8 in. from 23 in. x 27 in. ingot, 0.32 to 0.36 per cent carbon.)

The average tonnage is 17,180 tons per month. The fact that much more than this could be rolled if other mill conditions did not prevent, shows that less than 19 kilowatt hours per ton would be reached if the mill should run at maximum capacity.

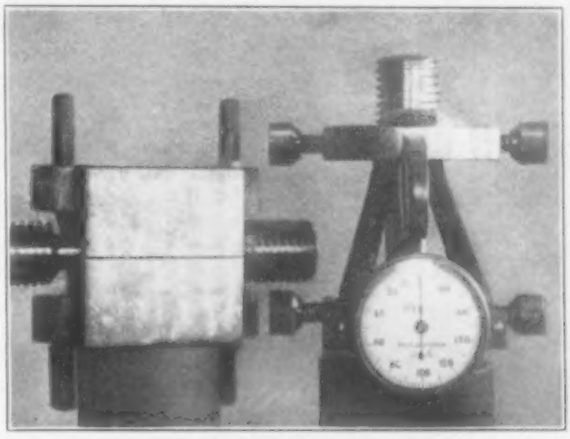
## Strike Is Postponed

SEATTLE, WASH., Sept. 8.—A strike of 12,000 workers in Seattle shipyards and plants engaged in fabricating shipbuilding materials, to enforce long-pending demands for wage increases, which had been set for Sept. 5, has been postponed by the Seattle Metal Trades Council, pending the conference of a delegation of labor representatives sent to Washington at request of the United States Shipping Board. The strike, if carried out, would affect every shipbuilding plant in the city, with the exception of the Skinner & Eddy plant and several smaller plants which have agreed to the employees' demands. The presidents of the three of the largest plants in Seattle were also requested by the United States Shipping Board to return to Washington for another conference in order that the settlement of the wage question in the shipyards may be settled without a strike. All of the plants involved hold government contracts.

The Spicer Mfg. Corporation, South Plainfield, N. J., has succeeded to the business of the Spicer Mfg. Co., and will conduct the business on an enlarged scale.

## New Extensometer for Determining Elastic Limit

A new extensometer, for measuring the elastic limit of steel, has been brought out by the Riehle Bros. Testing Machine Co., Philadelphia. A feature not heretofore provided is the provision to attach it to opposite sides of the bar and indicate the actual mean stretch



The Dial Extensometer

between the two sides. This is accomplished by mounting the lower points of attachment in a frame which can swivel about its center and thus accommodate itself to unequal stretch in the opposite sides.

With the apparatus a block is supplied with which a specimen is center punched 2 in. apart on opposite ends of a diameter. The extensometer is then taken in hand with the forefinger through the hole shown under the top frame, and the thumb resting on the clip above the top frame. The hardened contact points are thus brought about 2 in. apart. The instrument is put up to the bar and with the other hand the screws are set in the marks which have been previously made as stated above. The specimen is then gripped in the testing machine in the usual way. The dial of the indicator can be rotated with the fingers so that when the specimen with the extensometer attached is in the machine ready for testing, the dial is moved until the pointer stands over zero and test is begun.

As load is applied the pointer moves slowly around the dial at first, indicating the elongation of the bar in ten-thousandths of an inch, but when the elastic limit is passed the pointer moves much faster (sometimes giving a distinct jump) making it possible to see the elastic limit with the eye.

There are no electrical contacts, no adjustment of a micrometer screw and no reading of a micrometer dial. Readings can be taken for a stress strain curve at equal increments of load while the testing machine is running. The instrument has sufficient motion to carry the test well beyond the elastic limit before it must be removed.

## Cleveland Plant Taken Over

The plant and business of the Cleveland Machine Tool Works, Cleveland, maker of horizontal boring mills, has been sold by J. G. Bellinger to interests that control the Cleveland Milling Machine Co. The plant will be operated under the name of the Cleveland Machine Tool Co., which has been incorporated with a capital stock of $200,000. The officers are Frank S. Shields, president; John A. Camm, vice-president, and L. M. Richards, secretary, all of whom are officers of the Cleveland Milling Machine Co., and James H. Whitelaw, treasurer. It is the intention of the company to about triple the output of the present plant.

The New York School of Heating and Ventilating announces the opening of its fifth annual season, Monday and Wednesday evenings, at room 512, World Building, New York. The school is conducted by Chas. A. Fuller, 101 Park Ave., New York.

# The Rôle of Nickel in Making Steel*

## Comparative Physical Results From Adding Various Amounts — Effect on the Structure and the Reasons Therefor

BY R. R. ABBOTT

IN its most simple and fundamental form steel is a more or less rigid mechanical mixture of pearlite and iron, the pearlite itself being a much finer mechanical mixture of cementite ($Fe_3C$) and iron. In common with such mechanical mixtures the physical properties of this alloy bear some ratio to the percentage of its constituents. For various reasons the ratios of these physical properties are not straight-line functions of the carbon contents. One of these reasons is the fact that, practically, we do not have a perfect mechanical mixture, but the iron always carries some carbide solution, the amount of which increases with the carbon content of the alloy. Another reason is the changing ratio between the areas of the boundaries between the iron and the cementite, and the amount of these two constituents as the carbon content varies.

It is very evident that in order to make a change in the physical properties of any individual alloy the pure carbon-alloy series, we could proceed in one of three ways: To change the nature of the pearlite; to change the nature of the iron; and to change the nature of both the pearlite and the iron. The second cannot be entirely distinct from the first procedure, because of the iron in the pearlite.

In practice the physical properties of this simple iron-pearlite alloy is changed by three methods:

1. Addition of various elements to it;
2. Changing the relative amount of free iron present; and
3. A combination of both methods 1 and 2.

Under method No. 1, if more than the normal amount of any element present in a simple carbon steel is added, the steel is known as an alloy steel. Under method No. 2 come the various processes of heat treatment.

When nickel is added to the iron-pearlite alloy it dissolves entirely in the iron, and the physical properties of the alloy are changed approximately to the extent we should expect, when we consider that it is a solid solution of nickel and iron for one element and a pearlite with this solution for one of its constituents for the other.

### Effect of Adding Nickel

The effect of alloying nickel with pure iron is to increase the elastic limit, tensile strength and reduction of area, but to decrease the percentage of elongation. This effect is the same when carbon is present, and it is found that a given amount of nickel produces about the same change in physical properties, irrespective of the percentage of carbon. The average effect of nickel up to 8 per cent upon an iron-carbon alloy is as follows:

0.01 per cent of nickel increases elastic limit 40 lb. per sq. in.
0.01 per cent of nickel increases tensile strength 42 lb. per sq. in.
0.01 per cent of nickel increases reduction of area 0.005 per cent.
0.01 per cent of nickel decreases elongation 0.010 per cent.

Expressing this for a 3.5-per-cent nickel steel, which is the most common commercial alloy, such a nickel steel should have 14,000 lb. per square inch higher elastic limit, 14,700 lb. per square inch higher tensile strength, 1.5 per cent greater reduction of area, 3.5 per cent less percentage of elongation than a steel of the same analysis, but without the nickel.

(By the percentage of reduction of area and elongation, is meant the actual number of units of change. For example: A steel with no nickel has a reduction of area of 53 per cent and an elongation of 26 per cent; the same steel with 3.5 per cent nickel would have a reduction of area of 54.5 per cent and an elongation of 22.5 per cent.)

The elastic limit and tensile strength are then increased by nickel due to the increased properties of the solid solution of the nickel in the iron. The reduction is practically altered but little, but the elongation is quite appreciably decreased.

When a plain carbon-iron alloy is heated above the upper critical point (Ac3), the cementite is dissolved in the iron of the pearlite at the passage through the lower critical point (Ac1) and this solution progressively dissolves the remaining iron during the heating up to the Ac3 point, at which point it is all dissolved and the solution is homogeneous. Upon cooling, the reverse action takes place, but when nickel is present this separation of the cementite from the iron-nickel solution does not progress as completely nor as easily as from a plain iron solution, and therefore the pearlite areas in a nickel steel are larger and much more poorly defined than would be the case in the same steel without nickel. This effect becomes more marked, the more rapid the cooling, and since the pearlite areas are much stronger than the iron areas we find that in practice a nickel steel, compared to one without nickel, when air cooled, will have a higher increase in tensile strength than that given above, which represents perfectly annealed alloy.

When steel is broken down too rapidly in rolling it frequently shows a decided segregation of the pearlite areas along lines parallel to the rolling direction. Nickel apparently tends to intensify this effect and occasionally under even normal rolling this condition is encountered in nickel steel.

The lower and upper absorption (critical) points of nickel steel upon heating, as well as the magnetic critical point, are all lowered by the addition of nickel. The amount of the lowering is given approximately by the following, with reference to a diagram of the critical temperatures of a pure iron-pearlite hyperentectoid alloy:

| | |
|---|---|
| 0.01 per cent of nickel lowers *GO* | 0°.235 C |
| 0.01 per cent of nickel lowers *OS* | 0°.180 C. |
| 0.01 per cent of nickel lowers *MO* | about 0°.087 C |
| 0.01 per cent of nickel lowers *PS* | 0°.103 C |

In working with the $Ac_2$ point these figures are not based upon as accurate an investigation as for the Ac1 and Ac3 points. As the nickel contents are increased and the critical temperature progressively lowered, it is evident that finally the upper absorption point will reach the temperature of the atmosphere (20 deg. C.) and we will have an austenitic alloy; the greater the amount of carbon the less nickel it takes to reach this condition.

When a piece of steel is quenched from above the upper absorption point rapidly enough the result will be the complete absence of iron as a constituent of the alloy. This process is the basis of most heat treatments.

The martensite which is thus produced has physical properties entirely different from the mechanical mixture with which we started. A martensite containing nickel has a higher elastic limit and maximum strength, but a slightly lower reduction and elongation than a similar one without the nickel.

A heat-treated nickel steel, while having a lower reduction and elongation than a correspondingly heat-treated steel without nickel, has more than enough increase in strength to make up for it; in other words, with a given strength the nickel steel will have a

*From a paper presented at the twentieth annual meeting of the American Society for Testing Materials, Atlantic City, N. J., June 27, 1917. The author is metallurgical engineer, Peerless Motor Car Co., Cleveland.

greater degree of toughness. Likewise, as we increase the strength of an alloy (either heat-treated or not) by means of nickel, the loss in reduction of area and percentage elongation is far below the loss secured when the strength is increased by increasing the carbon content. In other words, nickel as a strength-giving element is not accompanied by such a loss in toughness as is carbon.

The effect of nickel upon the elastic limit and tensile strength of heat-treated steel varies with the amount of "draw" or temperature of reheat after quenching.

The following formulas represent the effect of 0.01 per cent of nickel upon a ¾-in. bar of steel; in these formulas T is the temperature of draw in degrees Centigrade and the results represent the increase in pounds per square inch:

Elastic limit ..... 287 — 0.174 *T*
Tensile strength ..... 294 — 0.214 *T*

The reduction of area and percentage of elongation are reduced approximately the same amount, and this amount is not affected greatly by the temperature of draw; 0.01 per cent of nickel lowers the reduction of area and percentage of elongation about 0.0073 per cent in heated-treated steels. This slight amount is practically negligible for commercial nickel steel.

Nickel decreases the rate at which steel will absorb carbon in the carbonizing process. The amount of this is approximately 0.04 per cent for each 0.01 per cent of nickel.

## All Given Square Deal

WASHINGTON, Sept. 11.—Notice is being sent to a long list of manufacturers in position to supply material for the Navy that the Bureau of Supplies and Accounts will hereafter insist upon doing business with producers wherever possible. Manufacturers are also being advised to bid direct with the bureau and not through the medium of so-called manufacturers' agents or representatives. All bidders are assured of fair and equitable treatment, and it is stated that the purchasing officers will zealously look out for the interests of absent bidders whose proposals reach the department by mail and that no advantage will be obtained by bidders who personally attend the openings or who are represented by agents.

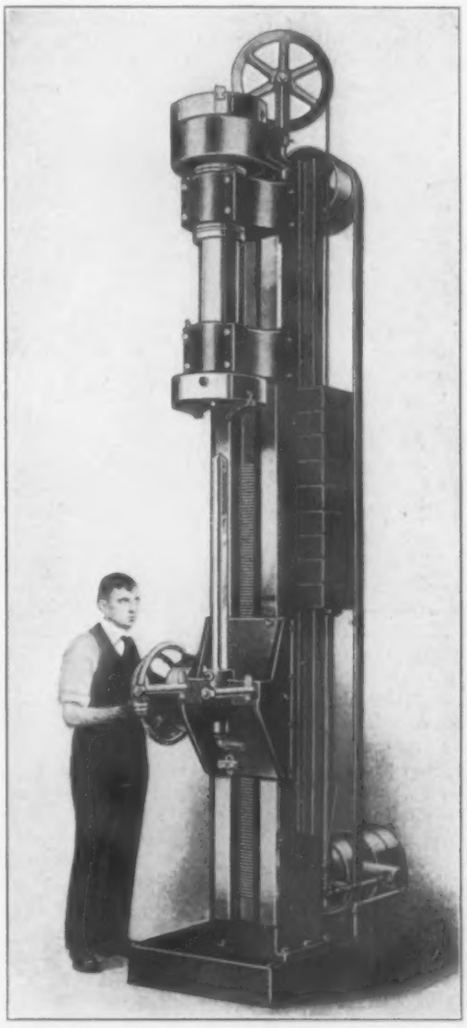
The Navy Department has been induced to send out this notification as a result of the operations of a large number of more or less reputable persons who have sought to take advantage of the enormous amount of war business now being placed by the Bureau of Supplies and Accounts. Some of these agents have long represented here well-known manufacturers and have employed none but legitimate methods. In view of the expansion of the Government's business they are now seeking to add to their clients, and the Department has no reason to believe they are doing anything improper in this connection. There are many others, however, who are seeking to make connections with manufacturers and supply houses by representing that they have special facilities for bringing goods to the attention of the department officials and special influence with which to secure contracts. As the department is making its purchases on a strictly competitive basis and is showing no favoritism, even to contractors who have a long record of excellent service to the Government, there is absolutely no basis for the representations being made by these agents and the department desires, as far as possible, to prevent manufacturers from being misled by these false pretences.

President T. J. Bray of the Republic Iron & Steel Co. states that work is progressing as fast as possible on the two new 80-ton open-hearth furnaces and also on the two 4-hole soaking pits being built by that company. Other minor additions are under way, the total cost being estimated at about $1,000,000. When the two new furnaces are completed, the Republic company will have a total of 14 80-ton open-hearth furnaces, making it the largest producer of open-hearth steel in the Youngstown district.

## Drilling Machine for Recoil Cylinders

A line of machines for drilling holes in recoil cylinders has been brought out by the Charles Stecher Co., 1574 Crossing Street, Chicago. This machine is a development of the company's line for drilling holes in lathe spindles and work of similar character and two units are built, one for doing the first or rough boring operation, while the other is for finishing. The drill is mounted in a vertical position and is fed upward into the work, an arrangement relied upon to prevent the chips from clogging the drill. The machine is designed for boring a hole 3¾ in. in diameter and 63 in. long.

The spindle has a chuck at the lower end in which the piece to be drilled is mounted and the maximum



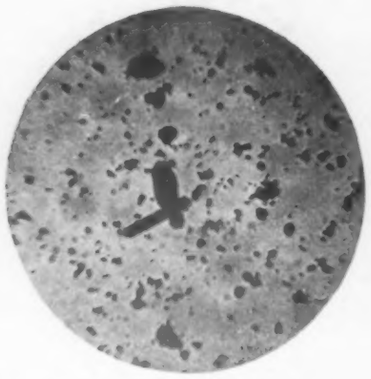
A Hole Approximately 64 In. Long Can Be Drilled in a Forging Intended for Use as a Recoil Cylinder, the Drill Being Fed Upward into the Work

diameter of work that can be handled by the machine is 5 in. The drill is fed by a handwheel which controls the movement of the sliding head along the rack cut in the face of the column. The feeding mechanism is arranged to provide for different rates by the use of a pair of removable gears. Belt drive from an overhead countershaft is employed.

In addition to the drilling machine illustrated, a smaller size for handling stock up to 5 in. in diameter and about 3 ft. in length is built. This is intended for use by manufacturers of lathes, airplanes, automobiles and locomotives.

The Detroit Pressed Steel Co., Detroit, has awarded a contract to the Heinle Co., metal-rolling engineer, Pittsburgh, for the development of a machine to roll steel wheels for automobiles.

Abrasive Impurities in a High Grade Micaceous Graphite—120 Diameters



The Central Crystal Is Silicon Carbide in Artificial Graphite—120 Diameters

Glass Surface Abraded by Crystals of Silicon Carbide—120 Diameters

# GRAPHITE LUBRICATION

## Abrasive Properties of Impurities—Emulsion in Oil and Effect of Size

EARLY in his experience with bearing and lubricating problems, Christopher H. Bierbaum, vice-president, Lumen Bearing Co., Buffalo, was convinced that the results obtained from the use of graphite as a lubricant were unsatisfactory and this, he says, led him to an investigation of its use. In a paper presented some months ago before the Buffalo section of the American Society of Mechanical Engineers, of which the following is a review, he discussed some undesirable properties of graphites used for lubrication, and, more especially, the abrasive effect of impurities on lubricated surfaces.

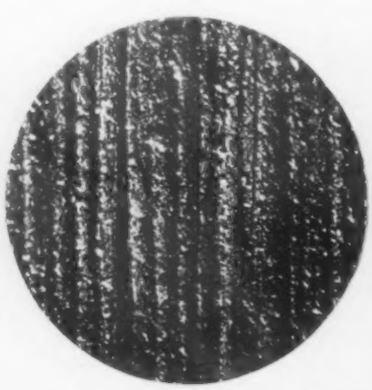
Impurities are found in both natural and artificial graphites. Impurities found in natural graphites are usually earthy admixtures and in artificial graphites the impurity usually is silicon-carbide, which next to the diamond is the hardest known abrasive substance. Micaceous graphite also may contain layers of mica which make their use on bearings undesirable. The presence of these impurities in the graphites studied was revealed by the aid of photomicrographs and their abrasive properties were determined as follows. A small soft wood block was placed on the end of a small fan-motor shaft. The impurities mixed with oil were applied to the end of this wooden block, and a microscopic slide was then held against it while it revolved rapidly. After this a photomicrograph of the microscopic slide, using oblique illumination, showed the abrasive effect of the impurities. Only those particles which were hard enough to cut glass were brought into consideration. A photomicrograph of a glass surface abraded in this manner by using artificial graphite which was marketed in the dry form is shown in an illustration. The sharp cuts shown in this view are characteristic of a high-class abrasive.

An artificial graphite compound marketed in the form of a graphite grease also caused abrasion. In an amorphous natural graphite the impurities were somewhat clotted together, though sharp and distinct crystals were discernible. The crystals were more or less rounded, and abraded the surface in a manner resembling that of sea sand. It is argued that the impurities of graphite can be counteracted by increasing the amount of graphite used, but this cannot be done, for any abrasive impurity present in the graphite will have a destructive effect upon the bearing surfaces. This was demonstrated by the abrasion of a bronze gear tooth of a rotary pressure pump by the mixture of equal parts of water and fine air-floated graphite which it pumped through a burr mill for grinding. Two photomicrographs of this tooth are shown, one being that of its surface before use and the other that of this surface after the tooth had been in service 30 days. When a graphite from which the impurities had been removed by the Bierbaum process was tested there was no abrasion.

One of the illustrations shows a fungus growth in a graphite compound purchased on the market and evidences the fact that a vegetable or animal oil was used, at least in part, in its preparation. Graphite compounds using animal or vegetable oils should be thoroughly sterilized before they are sealed in their containers.

The suspension of graphite in oil to facilitate lubrication does not appear difficult since there is a film tension of oil around each particle of graphite, and the oil has a positive capillary affinity with the surface of the graphite. Also by the fine subdivision of the graphite its aggregate surface is increased enormously and microscopic observations seem to indicate that particles 1/200,000 in. in diameter are beyond the reach of the action of gravity. However, when the particles of graphite are fine enough to defy the force of gravity, they are subject to another force known as the Brownian movements. This approaches perpetual motion of the graphite particles. It is not a continued movement in one direction, but a zigzag course, caused by the free electrons striking the particles of graphite. During these erratic movements the particles of graphite collide with each other and as a result adhere. In this manner there is gradually built up a mass of adhering particles which is subject to the action of gravity and settles out.

The value of a permanent suspension of graphite in



Original and Abraded Surfaces of a Bronze Gear Tooth Showing How Impurities in Air-Floated Graphite May Injure Bearings—100 Diameters

Fungus Growth in Graphite Compound Prepared with Oil—900 Diameters

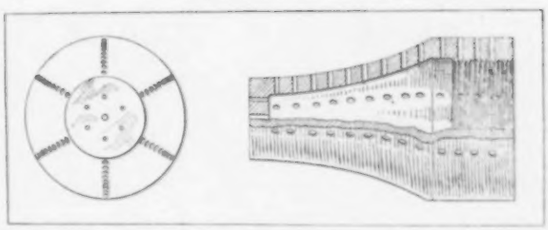
oil is more fanciful than real. In all such attempts the graphite is ground until its fineness mitigates against its usefulness. In a bearing properly constructed, lubricated and in operation the bearing surfaces are completely separated by the oil film and the extremely fine particles of graphite simply float in the oil, exerting no appreciable effect either beneficial or otherwise. However, when the oil between the bearing surfaces is squeezed out the graphite remaining serves as a solid lubricant, being crushed and imbedded in the grain and pores of the surfaces. The smaller the particles of graphite the more will be carried away with the oil and the less will be intercepted between the bearing surfaces. Therefore, a given amount of graphite is most efficient if it exists in particles of the largest possible size.

The carbon content of graphite is not an indication of its lubricating value or its purity, as the percentage of amorphous carbon in some varieties is comparatively high. Amorphous carbon, or carbon not completely graphitized, can best be classed as an inert impurity. Its presence always shows extreme blackness. The same is true of another common impurity, hydrogen, or a hydrocarbon, which is also black. Pure graphite is a dark, steel gray when mixed with clear white oil. The chemical laboratory can only give valuable information on the subject of the graphites when the work is done by an expert.

## COOLING SHELL FORGINGS

### Apparatus Using Compressed Air, Saving Time and Improving the Product

A method of air cooling 9.2-in. forgings for shells, indicated in the accompanying drawing, has been obtained from J. W. Dunphy, engineer, Canada Cement Co., Ltd., Montreal, Que., who generously contributes the information together with some comments on the performance of the apparatus. The decided success ascribed to it will make it of interest to manufacturers of shell steel.



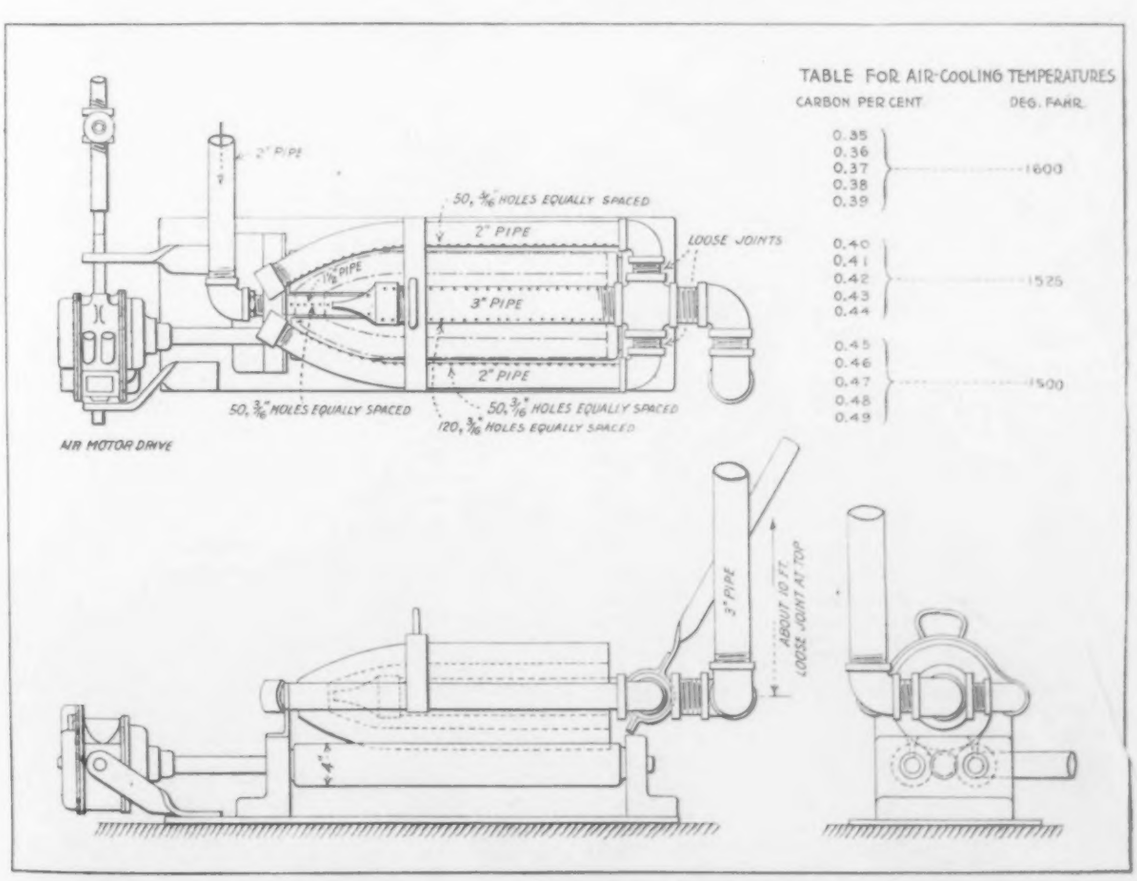
The End of the Internal Air Delivery Pipe Serves Also for Centering the Forging

For example: With steel having the following chemical analysis: Carbon, 0.42 per cent; silicon, 0.063 per cent; sulphur, 0.034; phosphorus, 0.025; manganese, 0.48, the physical results after proper heat treatment and cooling under ordinary atmospheric conditions gave a yield point of 40,300 lb. per sq. in., a tensile strength of 80,600 and an elongation of 27 per cent. The results with cooling with the apparatus shown gave a yield point of 49,300 lb.; a tensile strength of 94,000 lb. and an elongation of 25 per cent.

The air consumption is 2100 cu. ft. per min. and it takes approximately 5 min. to cool the forging from the temperature on coming from the furnace to 800 deg. Fahr. The air is supplied at 80 lb. per sq. in. The drawing indicates how the air pipes are lifted and swung away to remove the one and place in position the next forging. A compressed air motor is employed to rotate one of two rollers on which the forging is supported, the other acting as an idler so that the forging is rotated while the forging is cooled.

One of the illustrations shows the special nozzle on the end of the internal air pipe. This service as a centering device and is drilled as indicated to cool the nose of the forging.

The matter of belts and belt guards has been made the subject of No. 7 of the series of bulletins on "Safe Practices" being prepared by the National Safety Council, Chicago. This bulletin covers illustrations of various forms of guards for belts and includes a specification used for leather belting.




Compressed Air at 80 Lb. Pressure Is Discharged Against Inside and Outside of Hot Shell as It Is Revolved

# The Manufacture of Oxide of Zinc*

## Details of the Process and the Plant of the New Jersey Zinc Co.—Composition of the Ores, the Product and Its Uses

BY GEORGE C. STONE

THE method of making oxide of zinc direct from the ore was invented and developed at the works of The New Jersey Zinc Co. at Newark in the middle of the last century. The process was invented by Burrows, who had not the ability, financial or technical, to work out the details necessary to make it of commercial value. This was done by Col. Wetherill, whose name is commonly attached to this process. The grate bars used are also frequently called Wetherill grates, which is a misnomer because they were in common use for boiler firing at the time and he never claimed their invention.

The invention of the process was due to the efforts of The New Jersey Zinc Co. to find a profitable means of working the ores from Franklin and Sterling Hill, N. J. These are a mixture of franklinite, willemite and zincite, containing about 20 per cent of zinc. The first attempts were to make spelter, which were not successful, owing to the low grade of the ore and the fusibility of the residue. Failing in this, the next attempt was to make oxide in large muffles and reverberatory furnaces. This succeeded, although the cost of operation was high, the recovery low, and the quality of the product uncertain. In 1855 the new process was patented and has been in successful operation ever since.

Essentially the process is to spread a mixture of coal and ore on a body of burning coal on a perforated grate and blow an excess of air through the grate. The zinc is reduced in contact with the coal, volatilized and burned by the excess of air in the upper part of the furnace and in the flues. It is then carried to the bag rooms by the excess air and products of combustion which are forced through the flues by fans. In its main features, the process is the same to-day as at the time of its invention, but the details have been so modified that it would hardly be recognized by its originators.

### The Ores, Fuel and Fluxes

The process is applicable to all the oxidized ores of zinc and to roasted sulphides, provided the gangue is not so fusible as to leave a residue that is impervious to the blast. In many cases the ores contain impurities that make it impossible to produce an oxide of a good enough color to be available as a pigment. These impurities are any volatile metals that form colored oxides or sulphides. Cadmium is one of the worst. Lead, which is one of the commonest impurities in zinc ores, also injures the color. It is often objectionable, particularly when the oxide is to be used for the manufacture of rubber goods. Sulphur as sulphides or as sulphurous anhydrides are objectionable.

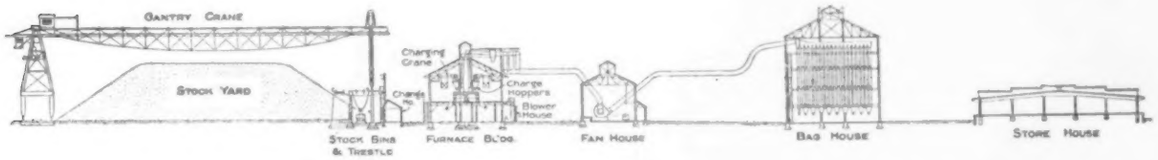
The fuel used must be one that does not give a black smoke which would ruin the color of the oxide. Anthracite is the most satisfactory and the one generally used. In the West, where anthracite is expensive, semi-bituminous coals, low in volatile qualities, are substituted for it in whole or in part, but they are never as good. Coke alone does not work well, as it causes a very intense local heat that makes the residue impervious to the blast. It is occasionally used as a part of the charge fuel.

With siliceous ores, limestone is sometimes added, but in general it does more harm than good, owing to its tendency to make the residue too fusible.

### Preparation of the Charge

The ores and coal are usually received at the works in fine enough condition for use without further crushing. Nearly all the ores are either concentrates or roasted products and are inevitably finer than is necessary. As the small sizes of coal are suitable for the purpose and are cheaper than the large, they are invariably used. If fluxes are used they are crushed to about the size of the ore and coal. There should not be a great difference in the size of the different materials, or it will be impossible to mix them properly.

The Palmerton plants, the West and the East, of The New Jersey Zinc Co. (of Pennsylvania), are the largest and best-equipped oxide plants in the world. They are similar, but the East plant has fewer and larger bag rooms and differs somewhat in details. At both plants the raw materials are delivered on the trestle at the south of the plant and are either placed in bins or stocked in piles. The ore and coal are taken from the bins to the mix-house by larries. The mixed charges are delivered to the bins above the furnaces and distributed by traveling cranes. Each block of furnaces is a separate unit, having its own blower, exhaust fan and bag room. The oxide is trucked from the bag rooms to the packing room and the final packages skidded or trucked to the storehouses.




Longitudinal Section of the East Plant of the New Jersey Zinc Co.'s Zinc Oxide Works

The ore and coal at the East plant are delivered on the double track, steel and concrete trestle, 22 ft. (6.7 m.) high with Brown tangential bins below the track next the furnace room. Materials for current use are dumped directly into the bins and the surplus is stocked back of the trestle by a bridge crane of 233 ft. 9 in. (71.25 m.) span equipped with a 10-ton Brown grab-bucket. This equipment also returns materials from the stock piles to the bins when necessary. The charges are drawn from the bins to a weighing larry which has two hoppers, each containing a furnace charge. These are carried to Ransome concrete mixers placed at one end of the furnace room. The mixed charges are elevated by a pair of counterbalanced skips to bins above the furnaces. From the bins the mixed charge is taken to the furnaces by cranes each having three hoppers holding one-third of a furnace charge each. Each hopper is placed on a scale so that the charge is equally divided between the three.

### The Furnaces and Operation

The furnace rooms at the two plants are quite similar, the main differences are that at the West plant the furnaces are carried on a concrete foundation

*From a paper to be presented at the St. Louis meeting of the American Institute of Mining Engineers in October, 1917. The author is metallurgist, New Jersey Zinc Co., New York.

and at the East plant, on the floor. In both cases the furnaces are elevated sufficiently to allow the residue to be dropped into hoppers below the floor and then into cars. The West plant furnace room contains 34 blocks of furnaces and the East plant 26. All the blocks are alike, consisting of four furnaces 19 ft. 6½ in. by 5 ft. 11½ in. (5.96 by 1.82 m.). Each furnace has independent blast and flue connections and three charge openings in the roof surmounted by hoppers. Each furnace works three charges in 24 hr. The different furnaces of the block are charged alternately at 2-hr. intervals in regular order. Charging in this way, there is always one furnace starting, one nearly finishing, and two working strongly, and the volume and temperatures of the gases to be handled are nearly uniform at all times.

When the furnace is worked off the dampers in the flues are closed, cutting it off from the bag room. The blast is shut off and the working doors taken down. Three men work on the furnace at once, each having a separate door. The loose material on top of the charge is raked off and dropped on the floor close to the furnace. The clinker is then broken up by heavy slice bars and raked into hoppers under the floor. The furnacemen then thoroughly clean the side and back walls from any clinker that has fused to them.

When all of the old charge has been removed and the furnace cleaned, the grate is covered as rapidly as possible with a thin layer of coal, the doors closed and a light blast turned on. The coal is lighted by the radiation from the hot arch and it is important that it should light quickly and evenly. When the bed coal is burning brightly, the charge from the hopper is dropped on to it and leveled. The doors are now closed, the blast turned on, and the furnace left to itself with occasional inspection to stop any blow holes that may form. With the large charges that are now worked, it is considerable time before any zinc vapor appears. When it does, the dampers in the flues are reversed, sending the gases and oxide to the bag room.

The blowers for the oxide furnaces are direct-connected to motors, the wheels of the blower being placed on extensions of the motor shaft. They are located in small houses outside the furnace room, two in each house.

Each furnace has two outlet pipes, usually 20 to 22 in. (0.5 to 0.56 m.) in diameter which lead up to the drum pipe overhead. The drum has an outlet in the middle of its length leading to the exhaust fans. The exhaust fans are extra heavy plate fans with special Hyatt roller bearings and water-cooled shafts, belted to motors. For convenience in attendance a number are placed in one building. The West plant has four fan rooms, three containing eight fans each and one containing ten fans. At the East plant there are two with 10 fans each and one with six. From the exhaust fans to the bag rooms, in each case, run round pipes 3 ft. (0.92 m.) in diameter, made of No. 16 sheet iron and provided with numerous clean-out openings. In all cases the pipes are arranged to give as nearly as possible the same length from furnaces to bag rooms, to equalize the friction in the different lines, but mainly to secure proper cooling of the gases before reaching the bag room.

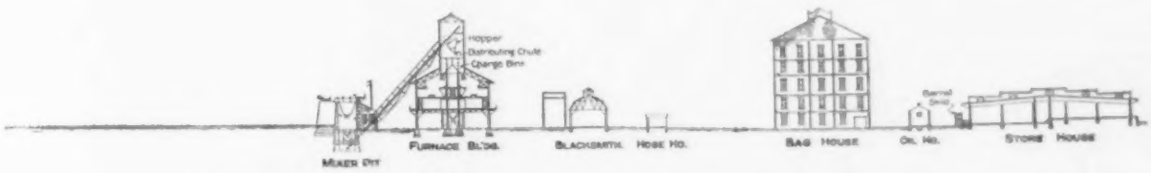
### The Bag Rooms

The method of collecting oxide in bags was first patented by S. T. Jones in 1852 and has been patented by others many times since. The bag rooms at Palmerton vary considerably in size; the first two built holding bags enough for four blocks, while the latest contains the bags for twenty. The larger rooms are more economical in labor and do not cause any inconvenience, provided the ventilation is equally efficient. The bags used are all of heavy, closely woven cotton sheeting 22 in. (0.56 m.) in diameter and about 40 ft. (12 m.) long. In the majority of cases the gases enter a header at the top of the room and from there pass to a series of parallel pipes from the bottom of which the bags are connected to hoppers, four bags to each, with a single collecting bag tied to an outlet at the bottom of each hopper.

At intervals the gases are shut off from the two lines of pipe connecting with a single line of hoppers and the bags shaken. This pair of pipes is again connected to the main header and the next two lines shut off and shaken. The frequency with which the bags are shaken depends upon the relative area of grate and bags, and the amount and quality of the oxide being made. The proper ratio of grate surface to bag surface has been a subject of much discussion. It varies in practice between 1:80 and 11:30. The amount actually necessary depends mainly on the efficiency of the ventilation of the buildings and the frequency of shaking.

The collecting bags are removed from the hoppers every 24 hr., or oftener if necessary, and taken to the packing room. This is done by a trucking gang that removes the filled bags and replaces them with fresh ones, trucking them by hand to one side of the bag room where they are coupled together and the train drawn to the packing room by a motor.

The packing room is a four-story building of mill construction. The cooperage is at the East plant, next to the packing room, and has a capacity of about 2000 bbl. a day. The storehouses are all one-story mill-construction buildings with the floor elevated to the level of a box car. Power for both plants is supplied from a central station at the West plant between the oxide and the spiegel furnaces. The boiler room is equipped with Edgemoor boilers of 536 hp. each, which can be fired with coal or with the waste gases of the spiegel furnaces. The engine room parallels the boiler room and contains three horizontal cross-compound blowing engines for the spiegel furnaces; four direct-current generators, each direct-connected to a horizontal cross-compound Corliss engine; three Allis Chalmers turbo-generators, 6600 volts, and three phases, and two motor-generator sets.




Cross Section of the East Plant of the New Jersey Zinc Co.'s Oxide Works

### The Ores Used

The ores used at Palmerton are almost entirely concentrates from the company's mines at Franklin Furnace and at Sterling Hill, N. J. Three of these products are smelted for oxide, franklinite, half/half and dust. The composition of these is about as follows:

| | Franklinite. Per Cent | Half/half. Per Cent | Dust. Per Cent |
|---|---|---|---|
| Zn | 18.2 | 18.4 | 17.6 |
| Fe | 35.0 | 15.2 | 20.1 |
| Mn | 12.8 | 12.2 | 8.9 |
| $Si_2O$ | 3.6 | 12.6 | 7.2 |

The franklinite is worked by itself and the residue smelted in blast furnaces for the production of spiegel. The half/half and dust are mixed and the residue wasted, as it contains too little Fe and Mn and too much $SiO_2$ to be a profitable smelting material.

Franklinite is the easiest of these ores to work and gives the best product. The half/half and fines are mixed and worked together. The charges per furnace average in tons:

| | Ore | Coal |
|---|---|---|
| Franklinite | 2.62 | 1.62 |
| Half/half and fines | 1.95 | 1.36 |

### The Product and Its Uses

The product is divided into five grades, two for the use of paint manufacturers, two for rubber, and an off-grade that is reworked either for oxide or spelter. For the paint trade the grading is entirely by color. For the rubber trade, slight variations in color do not make so much difference. The variation in composition of the different grades is very slight, the range of composition of all being nearly the same. The material as shipped, uniformly contains 99 per cent or over ZnO, the principal impurities being: $SO_3$, 0.25 to 0.33 per cent; $H_2O$, 0.10 to 0.50 per cent, and PbO, 0.05 to 0.30 per cent.

The principal use of zinc oxide is as a paint pigment and for this purpose its purity of color and freedom from discoloration by gases and atmospheric conditions, fineness and uniformity make it particularly useful. As a pigment it has the disadvantage of slow drying and a tendency to become unduly hard in time.

In the manufacture of rubber goods zinc oxide is used for two purposes: As a pigment to produce white goods, and also to greatly increase the tensile strength of the resulting material. A mixture of pure rubber and sulphur vulcanized has a tensil strength of about 2000 lb. per square foot and an elongation of 960 per cent of its original length. Adding zinc oxide increases the tensile strength but diminishes the elongation. No other material tested has this effect.

As the supply of lead-free ores is limited and the demand for ZnO is increasing, much more leaded oxide is being made. The process is the same but the charges are usually lighter and the recoveries lower. In most cases the furnaces used are double ended with one or two working doors at each of the opposite ends.

### The Production of Oxide

It is impossible to give the production of oxide of zinc, as the statistics are not published by the Government. Such figures as have been made public are not comparable, because the grouping of the different products is not always the same. The increase has been very rapid, especially within the last 3 or 4 years.

## Inspectors of Ordnance Equipment Wanted

The Chief of Ordnance, War Department, 1330 F St., N. W., Washington, reports a need for inspectors of ordnance equipment. An examination for such inspectors has been announced by the Civil Service Commission. One class of this examination is for inspectors of hardware and metal equipment, comprising such articles as buckles, rings, fasteners, hand axes, wire cutters, intrenching tools, canteens, cups, meat cans, cutlery and other small articles of brass, iron, steel or aluminum.

Men who have had a high school or equivalent education and in addition have had four years' experience in a manufacturing plant making such articles as those described above will qualify for one class of inspectors. Another class of inspectors requires men over 25 years of age who are graduates from a college or university of recognized standing and who have had one year's experience in a manufacturing plant, on the practical end of the work.

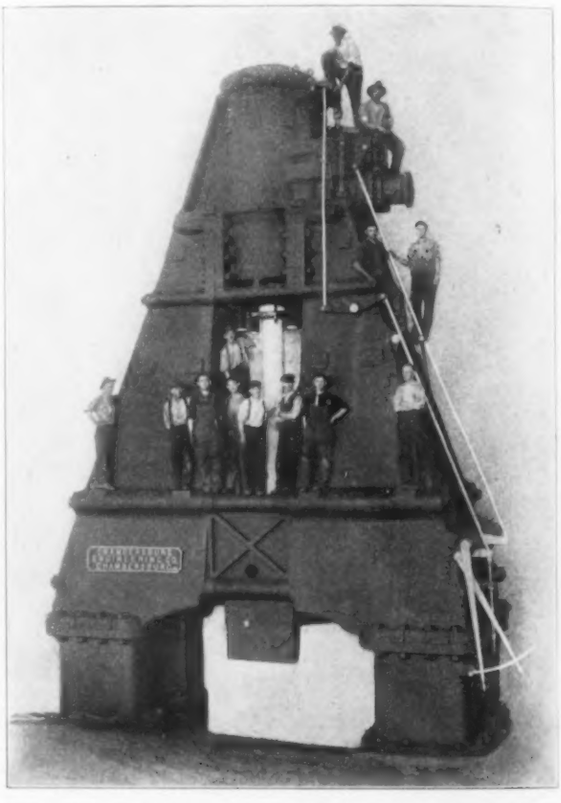
The duties of inspectors will consist in the organization and supervision of the inspection work in plants where equipment is being manufactured. They will also be responsible for the preparation of the necessary reports covering the inspection, shipment and payment for the articles described. The positions will be civil service appointments and the salaries will range from $1,200 to $2,400 per year, with additional allowance for travelling expenses.

Those who are interested can obtain additional information from the Equipment Division, Inspection Section, 1330 F Street, N. W., Washington, or from any office of the United States Civil Service Commission.

## Double-Acting Steam Forging Hammer of Record Size

The Chambersburg Engineering Co., Chambersburg, Pa., has recently built and shipped to the Washington Steel & Ordnance Co., Washington, D. C., a double-acting steam forging hammer, which is said to be the largest of its type ever produced in the United States. It required 14 railroad cars to ship the hammer in sections.

The hammer is described as a 40-ton, double frame, double acting, steam forging hammer, with cylinder of 40-in. bore and 96-in. stroke. The main steam pipe is 10 in. in diameter, the exhaust pipe 14 in. and the



Double-Acting Steam Hammer Built by the Chambersburg Engineering Company for the Washington Steel & Ordnance Company, Said to Be Largest of Its Type Ever Built

diameter of the large piston rod is 15 in. The ram proper is 51 in. wide, 66 in. front to back and 72 in. high. The ram is notched to handle a steel die 72 in. long, front to back, 41 in. wide and 28 in. high. The approximate weight of the die is 10 tons. The total weight of falling parts is approximately 80,000 lb.

The hammer was built for use with steam pressure of from 100 to 150 lb. per sq. in., and with full steam pressure is capable of delivering a blow of 8000 tons. The anvil, steel anvil cap and steel die weigh 350 tons. The total weight of the hammer is 600 tons.

The main cylinder is lined with cast-iron bushing of special mixture. The cylinder proper is mounted between the two main frames in machined fits and thoroughly bolted with body-bound bolts, the frames being shrunk together with four large rods or bolts, making the upper works of the hammer one rigid piece. This whole superstructure is mounted on four massive pedestals and fitted to them with large steel body-bound bolts. Underneath the four pedestals and securely fastened to them are the two heavy base plates, which are spaced apart with cast-iron distance pieces and shrunk together with two heavy steel tie bars.

The hammer was built to drawings, jigs and fixtures and all parts were machined accurately and independent of assembly. The erection of the hammer took but a few days in the Chambersburg shops. After arrival at the plant of the Washington Steel & Ordnance Co. it was set up and was in operation within one week.

# Engineering Revision Lessens Accidents

## Records in Steel Plants and Rolling Mills Show That Structural and Operation Improvements Prevent Loss of Time

IN a paper read before the fourth annual meeting of the International Association of Industrial Accident Boards and Commissions, held in the State House, Boston, Aug. 21 to 25, Lucian W. Chaney, special agent United States Bureau of Labor Statistics, discussed the accident rates in the iron and steel industry and advanced the argument that improvement in physical conditions and operating methods through the wise use of money upon engineering problems under the direction of the best engineering skill would result in an enormous saving in compensation costs. The speaker pointed out how safety organizations had reduced the frequency of accidents, but showed by his figures that the great cause of lost time—fatal or serious accidents—depended upon the work of the engineer for its elimination. A digest of some of the more striking statements in his paper follows:

### Time Loss Due Chiefly to Few Serious Cases

A careful analysis of the accident experience of the iron and steel industry pointedly suggests that the current belief that it is hopeless to think of anything like the elimination of accidents, at least within a measurable time, may be erroneous—that it may be possible to make industry so safe that fatal or serious accidents will be of exceptional occurrence. Until within a short time emphasis has been placed upon the frequency of accidents rather than upon their severity. The vast majority of accidents in the iron and steel industry are of minor character, more than 50 per cent causing disabilities terminating in less than one week. From the standpoint of time lost the small percentage of serious injuries is of much greater importance than the great percentage of minor injuries. The fatal accidents—only about 1.5 per cent of the total number of accidents—caused a total loss of time amounting to 65 per cent of the total time lost because of accidental injuries.

This figure is based upon an assumption that a fatal injury (assuming the employee killed of an average age of 30 years) is equivalent to the loss of 30 years' work time or 9000 days and that total disability is equivalent to 35 years because of the greater burden placed upon relatives and the community. Similarly 2196 days are allowed for the loss of a hand, 1845 days for the loss of a foot, etc.*

### Stress Mainly on Reducing Accident Frequency

Carelessness and ignorance of the worker are responsible chiefly for accidents of minor character only and the safety movement has stressed too little the importance of safe tools, machines, practices and construction. The belief has taken root that the great success of the safety organization methods in reducing accident frequency is also responsible for the decrease in fatal and serious accidents. If personal carelessness could be entirely eliminated, it may be said that it would have little effect upon the number of fatal or serious accidents as long as the structural engineering and organization defects are unchanged.

Real progress lies in the direction of engineering revision of structure and practice, for it appears from the present study that serious accidents are primarily due to fundamental engineering or structural defects in which the workman has no part. Much more than "mechanical safeguarding" is meant by the term "engineering revision of structure and practice." The latter expression is intended to suggest the widest application of engineering skill to industrial plants in the design and location of buildings, the arrangement of the transportation facilities, the means of access to every point where a worker must go, the introduction of adequate lighting, the guarding or replacement of dangerous machines and, in general, the removal of hazardous conditions.

The results of mechanical safeguarding, the first step of the safety movement, were rather disappointing and the system known as "safety organization" came into being. This appealed strongly to the human factor and its success in reducing accident frequency was immediate and extraordinary. As a result the engineering factor was pushed somewhat into the background. The following analyses of accident causes in several departments of the steel and iron industry seem to indicate that reliance must be upon adequate engineering revision and not upon the appeal to the human factor alone.

### Blast Furnace Accidents

Examination of the course of accident rates in blast furnaces from 1905 to 1914 indicates that the major part of the reduction in severity rates was due to structural and mechanical improvements. Hot metal "breakouts" contributed far more than any other cause to the severity rate, but the danger from gas has been controlled by structural improvements such as carrying the gas mains high in the air, providing more effective control by improved valves and by the introduction of oxygen helmets and resuscitation apparatus. Between 1906 and 1913 a reduction was made of 58.9 days (from 60.8 to 1.9 days) lost from injuries due to hot substances and a reduction of 10 days (from 15.4 to 5.4 days) lost from injuries due to asphyxiating gas. In contrast with these records, falls of workmen, which may be regarded as influenced by personal care, were decreased in severity rate by 1.9 days (from 7.5 to 5.6 days). Personal care also enters largely into injuries due to handling tools and the decrease in the same period was only 7.3 days, of relatively small importance when compared with the reduction in severity rate of injuries due to hot substances and gas. A considerable part of this decrease of 7.3 days must be credited to the greater care of the shop management in furnishing better and safer tools and in keeping them in proper condition.

### Open-Hearth Furnaces

In the earlier years, particularly in 1907, injuries in the open-hearth department showing a high severity rate were caused by cranes and hoists, due largely to structural defects then present, such as absence of footwalks, poor access to the crane cage, overhung gears and others. By 1911 these defects had been largely overcome and from then on the severity rate dropped markedly and consistently. The main cause of the early high severity rate were explosions, other than ingot, of hot substances. The individual workman can do little to prevent such explosions and almost inevitably some workmen are killed or severely injured, as there is rarely any warning to permit the men to escape. The severity rate of recent years has dropped mainly through the revisions in structure and method of operation which were primarily introduced to favor production. The severity rate for injuries due to power vehicles has also decreased and this must in a large measure be attributed to improved transportation facilities and improved methods of operation.

The severity rate of these three groups of causes of injury declined from 47.5 days per 300-day worker in 1907 to 8.3 days in 1913, a reduction of 83 per cent. In handling tools, in which the personal factor is prominent, the rate actually increased 17 per cent. While making this increase in the severity rate, the same accident cause was making a decline of 53 per cent in

*A strong movement is in progress to secure uniformity of this so-called "weighting" of losses through accidental injury in the reports of the industrial accident boards of the various states in order to make the results comparable.

frequency, from 195.5 cases per one thousand 300-day workers in 1907 to 92.3 cases in 1912. On the other hand, the first three groups, cranes, explosions and power vehicles, which were dependent upon engineering improvements, not only showed a decrease in the severity rate but also a decline in the frequency rate of 45 per cent, from 117.8 cases per one-thousand 300-day workers in 1907 to 64.5 cases in 1912.

### Accidents in Rolling Mills

Cranes and hoists furnish the only causes of injury in heavy rolling mills about which it is possible to make a positive statement. Better cranes, better chains and improved methods of operation have brought about a great reduction in the severity rates. In tube mill operations the lessened severity rates may properly be attributed to increased personal care and the occurrence of fatality is so rare that no definite data can be found to warrant a definite conclusion.

In operations in plate and sheet mills, in the mechanical department and in the fabricating shops, personal care and engineering revision have about equal importance, since many of the operations are of a manual nature. Fatalities seem to be almost invariably the result of some structural defect admitting of remedy even when due allowance is made for the importance of personal care.

Injuries caused by hot substances in the yard departments show a remarkable decline in severity rates, nearly all of which can be attributed to improved methods of transporting hot metal. The introduction of structural and operating improvements has influenced the severity rates at least as much and probably more than increased personal care.

### Importance of Organization

The contention that reduced frequency rates follow improvement in personal care and that reduction in the severity rate follows engineering revision is well sustained by this review. It does not diminish the importance of organization, for without organization and the interest it evokes the discovery and remedy of structural defects would never have occurred. Both the safety organization and the most intensive engineering study should be vigorously directed to the discovery and remedy of the less obvious structural faults.

### Analysis of Causes of Fatal Injuries

From fatalities occurring in plants having a total exposure of 247,038 300-day workers, data for 372 cases of death in the years 1910 to 1914 are available for an examination of the causes with a view of placing the responsibility for their occurrence. The fatality rate in this group of plants was 1.51 per one thousand 300-day workers, and the fact that the fatality rate for the whole industry for the years 1910 to 1914 was 1.20 cases per one thousand 300-day workers shows that these plants were in no way exceptional. In interpreting these death cases certain principles are necessary.

1. It is assumed that it is the primary duty of the safety man to make conditions safe rather than to educate the men to avoid unsafe conditions over which they have no control, and no amount of so-called contributory negligence on the part of the man is considered sufficient to transfer the responsibility to him if some fault of construction or arrangement could have been remedied to prevent the injury.

2. The fact that apparatus can be used with entire safety by the exercise of special care is not regarded as excusing the failure to provide safer apparatus.

3. The cost of remedying structural defects, even to the extent of entirely reconstructing a mill, should not bar its consideration. It is the contention in this discussion that if the element of cost is entirely disregarded serious and fatal injury can be very largely eliminated and if an industry or plant can be made safe only by prohibitive expenditure in reconstruction, it is a question whether that industry or plant should be permitted to continue maiming and killing workmen in order that profits may continue. The condition urged is ideal but not unattainable.

Engines and motors caused three deaths. Two of these could have been avoided by the guarding or removal of projections on the moving parts.

Transmission gear caused three deaths. Two of these were due to projecting set screws on shafts.

Nine out of seventeen deaths in working machines were due to mechanical or other conditions which should have been remedied and over which the operator had little or no control.

Forty-three out of seventy-seven cases in the operation of cranes and hoists could have been prevented by better design in the crane and by such operating methods as now prevail. Unsafe practice or imperfect structure for whose presence workers were not responsible and which no education of them could remove, may be strongly suspected to have entered not infrequently into the other thirty-four cases.

Hot substances caused 76 fatalities. Of 16 cases of electric burns 13 were preventable by the kind of construction now in common use in electrical installation. Of 12 deaths due to explosions 7 could scarcely occur with improved modern practice. Of 15 deaths due to hot metal 14 were caused by bad method or imperfect structure, at least in part, and for each condition under which these 14 cases occurred an effective remedy has been found. Of 25 deaths due to hot metal flying, 18 would probably not have occurred under the latest improved practice. Not less, therefore, than 52 out of 76 deaths due to hot substances have presented problems of revision of structure and method.

Appropriate structural changes would have prevented 29 out of 50 deaths due to falling objects. Better structural provisions would have prevented 22 out of 45 deaths caused by the fall of workmen.

Asphyxia caused 19 deaths, all of which were related to imperfect conditions involving changes in apparatus.

### Summary

To summarize this examination 212 out of 372 deaths or 57 per cent could have been prevented by some engineering revision and this can be said without qualification. It cannot be said that all of the other 43 per cent would have been amenable to educational methods in response to which caution would insure safety. It can be said positively that in only about 10 per cent of these deaths does the men's own carelessness clearly appear as the major factor. The remainder present a mixture of contributory negligence with possible structural imperfection impossible to untangle.

In a group of plants the figures for the year 1916, a year of extraordinary activity in industry, show a fatality rate of 0.86 cases per 1000 workers as against a rate of 1.51 for the preceding group for the years 1910 to 1914. In the group for the year 1916, 72 deaths occurred among 85,305 300-day workers. This distinct improvement is probably the result of extensive structural revision, but in spite of this improvement an analysis of the 72 death cases indicates that at least 58 per cent of them involved elements of structural defect or improper operative methods.

A study of the nature of the injury causing death in the entire industry in the years 1905 to 1914 was available in 956 cases and in a large proportion of these cases some structural improvement lessening the danger has been made subsequent to the accident. In this group of 956 cases, 24 cases of traumatic dismemberment are presented, which afford a startling climax to this presentation. These are cases in which arms, legs or heads were burned, sheared or forcibly torn from the body. Of 9 cases of legs lost one leg was burned off by a hot rod in a rod mill. The feet lost were ground off in exposed gearing of the transfer tables of rolling mills. Of the four decapitations recorded two were due to being caught by the hot rod loop in the rod mills and the other two were the result of power vehicle accidents.

It is but just to say that a large proportion of the striking cases of these 956 belong to the earlier portion included in this survey and that in many cases efforts have been made with small regard to cost to remedy the conditions which made these accidents possible and that usually such efforts have been successful.

The constant presence of human fault must not be permitted to obscure the fundamental causes which

can only be reached by the reformation of wrong conditions. In such obscurity, rules may multiply and men still die. The wide prevalence of the view which attributes the accident largely to the worker when he is at best but a contributing cause is illustrated in numerous safety manuals and safety directions. The remedy was thought to be entirely obvious. Make more stringent rules and spur up the foreman regarding their enforcement. This is useful but superficial. In many cases cited in safety manuals there is an obvious engineering remedy.

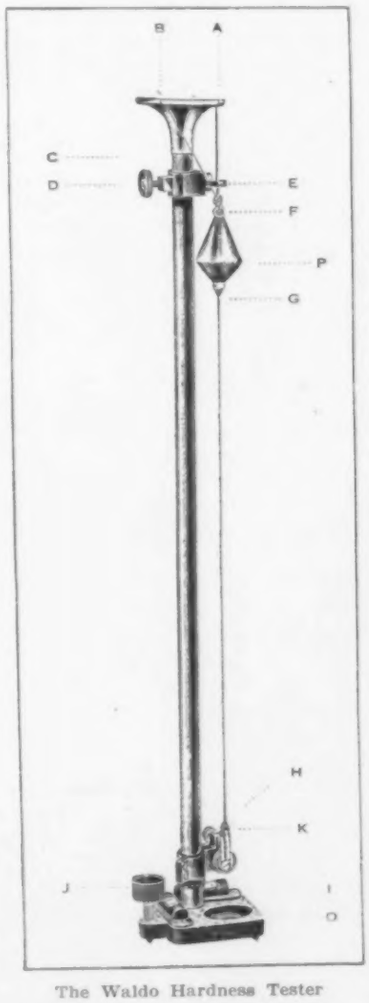
If, as is to be indicated by this study, the severity of accidents is influenced much more by engineering perfection than by human perfection, the problem of cutting down the severity is quite different and much more solvable. It is not a question of possible attainment but one of thought, time and money. It is possible to conceive industry conducted under conditions so safe that the occurrence of serious injury will excite the same surprise that its absence now does.

The argument advanced has an important bearing on accident compensation. If it is true that serious accidents may be practically eliminated at a sufficient expenditure of thought and money, there will result an enormous saving in the cost of compensation and the most liberal expenditure will be justified on strictly financial grounds entirely aside from the question of human suffering.

## New Hardness Tester—The Waldo

A new instrument for measuring the hardness of metals has been devised by Leonard Waldo, consulting engineer, New York. It is now obtainable from the Palo Co., 90 Maiden Lane, New York. It is known as the Waldo hardness tester and is patented.

The instrument is especially intended for use under conditions of service in that it is easily portable and its indications are uniform over definite periods of time. It is also easy to calibrate. The essential feature is a plummet weighing 0.1 lb. and falling 1 ft. to the surface of the material whose hardness is to be measured. This plummet *P*, shown in illustration, has a conical, replaceable, chill-tempered, 60-deg. steel point *G*, of which several are furnished with each instrument. Tied to its upper extremity is a very thin silk thread which bends over a funnel-shaped end piece *A*, *B*, *C*, into which, at *A* and *B*, slotted holes are cut with burnished edges so that the silk thread passes through them with practically no friction loss. The funnel, *A*, *B*, *C*, turns with a slight friction in the end of the jointed supporting brass tube, *I*, *C*. The silk thread is attached to a small burnished ring at its lower end, and the ring in turn is caught in a little trigger at *K*, which can be released by the thumb-screw *H* without jarring the instrument. The silk thread then passes from the release catch *K* through the hole *A*, through *B*, through an adjustable third hole at *E*, which is clamped in place by the thumb-screw *D* so that the plummet point *G* is exactly over the aperature *O* in the base of the instrument. The base is supported on three points, two of which are controlled by a leveling screw *J*. Small cross-levels indicate the verticality of the supporting rod, *I*, *C*.



The Waldo Hardness Tester

In use the instrument is set on the surface of the material whose hardness is to be tested, so that the aperature in its base *O* is concentric with the exact spot to be tested. The plummet is then hung as shown and lowered by holding the silk thread by its ring between the fingers so that the exact position of the clamp *D*, *E*, may be found for insuring the vertical fall of the plummet. This being determined, with the instrument leveled, the thread ring is placed in its releasing trigger *K*, and with the plummet in its position *F*, *G*, the funnel support *A*, *B*, is gently turned until the distance from the conical point *G* to the surface of the material to be tested *O*, is exactly 1 ft. The instrument is now ready for use.

A convenient way of stopping any slight swinging motion of the conical point *G* is to touch it gently with a small camel's hair brush or a piece of cotton wool. The instant the plummet is still, the trigger is released by the thrumb-screw *H*, and the plummet falls, making a uniform circular indentation in the material tested. The object in releasing the plummet from the bottom of the apparatus is to avoid any disturbance in its upper support. The entire operation consumes but a few seconds after a slight experience with the instrument.

## Large Production of Chrome Ore

Chrome ore or chromite production in the United States in 1916 exceeded all previous records. More than 47,000 tons was mined and sold, against only 255 tons in 1915, according to the U. S. Geological Survey. In the Pacific Coast States, particularly California, the increased output has been remarkable. In Oregon the production was more than 3000 tons last year, while in California it was nearly 44,000 tons. It is evident that for some time to come California will furnish the chief domestic supply with the output from some deposits expected to exceed this year that of 1916. The chief sources of supply for the United States in the last few years have been Rhodesia, New Caledonia, Turkey and Greece. The imports in 1916 were 114,655 gross tons. Chromite is important as a war material in making armor plate, armor-piercing projectiles, high-speed tools and other special steels.

An interesting feature of future chrome production lies in the fact that T. W. Gruetter has recently established at Kerby, Ore., a custom plant for concentrating black sand to win its gold and platinum. The black sand of the Klamath Mountains usually contains a considerable amount of chromite, and it is believed that by adding magnetic separators to Gruetter's plant to remove the other minerals from the tailings sufficient chromite may be obtained from the black sand in areas of chromiferous serpentine to make the operation financially successful. The process will evidently yield a high grade of chrome ore, which may be suitable for special uses.

There is considerable chromite in Cuba, but scarcely anything is known of its occurrence in Mexico or Central and South America.

Ferrochromium, the alloy used in making chrome steel, is now manufactured in the United States by electro-metallurgical methods, almost wholly in the East, at the plants of the Electro Metallurgical Co. at Niagara Falls and elsewhere. It is reported, however, that the Noble Electric Steel Co. has three furnaces at Heroult, Cal., operating to their full capacity in producing ferromanganese and ferrochromium. There is reason to believe that the domestic output of chromite could be so increased as to go far toward supplying the domestic demand if our imports, except those from Canada, were cut off.

# Varying Prices for Steel Are Favored

## Final Decision Will Be Made by the President—Question of Power to Secure Same Prices for Allies

WASHINGTON, Sept. 11.—The problem of fixing steel prices has proved far more complicated than the President or any of his advisers anticipated. Lack of knowledge of the ramifications of the industry and of the effect of geographical distribution and transportation conditions encouraged the belief at the outset that it would be a comparatively simple matter to fix a basic scale of flat prices that would apply equitably to all producers. The fallacy of this belief is now fully demonstrated to the President and to the Federal Trade Commission. Still further complicating the situation, however, looms the question of the power of the Government to compel American manufacturers to accept controlled prices for sales to the Allies. This factor in the equation possibly may not be solved without the aid of Congress and important developments in this connection are looked for at an early date.

### Unexpected Variations in Cost

When the President instructed the Federal Trade Commission to investigate and report on the cost of producing steel he was under the impression that practically all manufacturers with fairly equipped establishments were able to produce semi-finished steel products at a substantially uniform cost. He had a vague impression that the Steel Corporation, because of its size, was in somewhat better position in this respect than its competitors, but he thought the margin was so small as to be easily taken care of in any "reasonable profit" that might be decided upon.

The preliminary report of the Trade Commission, however, has changed the President's views and has presented a new problem. Costs are found to vary greatly in different districts and under various conditions of manufacture that prevail throughout the industry. Well integrated concerns naturally show lower costs than those which are obliged to purchase their ore, coal, coke, etc., or which buy semi-finished steel for further manufacture. If the Government were planning to buy a certain amount of steel at the lowest possible price without regard to other considerations the problem would be a simple one, as all calculations could be based upon the costs of the Steel Corporation or those of two or three of its largest competitors. The President is determined, however, that there shall be the widest possible distribution of Government orders; whether because he regards the business as desirable or undesirable from the producers' standpoint is immaterial.

### Different Prices for Different Plants

After studying the reports of the Federal Trade Commission the President turned them over to the War Industries Board which has since been devoting much time to working out a method of fixing prices that shall be as equitable as possible and that will permit of the execution of the President's plan for the widest possible distribution of orders. While the board does not include in its membership any one with a wide experience in steel making, yet Chairman Scott has an excellent knowledge of the industry and he is in position to obtain the advice of the Steel Committee of the Advisory Commission and other experts in the trade and it is understood that he has conferred with some of the best informed men in the business. At this writing the board appears to lean toward a price scheme based upon actual cost of production plus a reasonable profit in place of a scale of flat prices. It is conceded the flat price system would be much easier to enforce, but both the President and the board feel that it would be less fair to the smaller manufacturers, who would be called upon to supply material at smaller margins of profit than would be secured by their big rivals.

After careful consideration the board has presented to the President the practical advantages of the two systems and has left it for him to decide which plan shall be adopted. It is probable that the President will confer further with the members of the Federal Trade Commission before announcing his policy, as it goes without saying that should the cost plus profit method of price fixing be adopted the commission would be called upon to undertake an herculean task in supervising the cost records of the numerous manufacturers to whom Government business will be allotted.

### How Can Allies Get Government Prices?

The situation with respect to purchases for the Allies at controlled prices is daily becoming more acute and it is among the possibilities that no price fixing program will be announced until this issue is determined. Reports to the contrary notwithstanding, domestic producers of iron and steel are not selling to the Allies subject to the controlled prices to be determined hereafter. Chairman Scott of the War Industries Board recently stated that "no specific instances of refusal to sell" to the Allies at prices to be paid by the United States Government have occurred, but he apparently framed this answer to a question with unusual care and he declined to elaborate it further. This statement is regarded by those who are familiar with the facts as a diplomatic one quite justifiable under the circumstances. It is probably true that there have been no "refusals" for the reason that the War Industries Board has been very careful not to put the issue squarely up to the producers at this time. It is also true, however, that in many cases manufacturers have failed to comply with the "suggestions" of the purchasing commission to supply material to the Allies at the controlled prices in prospect and that the commission has not seen fit to push the matter.

### No Power to Enforce Sales to Allies at Low Prices

At the present time the war legislation of the past year is being carefully reviewed by certain legal authorities for the purpose of determining just what powers the President possesses to enforce sales to the Allies on a parity with those made to the United States. There is a large body of these statutes, including the national defense act, the naval appropriation laws of the past Congress, the act creating the Shipping Board, etc., etc., and in addition there are numerous statutes enacted during the past fifty years which deal with the right of the government to buy and sell. All these must be examined with minute care. It is understood that up to the present time no formal request has been made of the Attorney General for an official opinion for promulgation, but it is known that the President has personally consulted with Mr. Gregory and it may be assumed that the officials of the Department of Justice are assisting in the search now on.

Experienced lawyers familiar with the transactions of the Federal Government in the acquisition and disposal of property are almost unanimously of the opinion

that the United States cannot buy iron and steel or other war material and sell it to the Allies without further legislation, and doubt is also expressed as to whether Congress has the constitutional power to compel producers to sell to the United States Government at controlled prices goods which it is well known in advance are to be resold or transferred to a foreign government. The fact is recalled that whenever the Government has had occasion to sell material the disposal of which is not specifically authorized by law it has gone to Congress for legislative authorization. A notable instance is the sale to Greece of two battleships a few years ago which could not be effected until Congress had passed an enabling act. Current sales of used material by the departments are based upon specific statutes passed many years ago.

The delay in the signing of the contracts, which were to have been executed on Sept. 6, for the building of fabricated ships in Government-owned yards has been attributed to the uncertainty regarding the price of steel, for although the Government is to supply the shapes and plates for these vessels, the method of compensating the builders which has been adopted is such as to render it a matter of interest to the contractors to ascertain at least the method of fixing steel prices. The Shipping Board has taken the position, however, that this information is not so essential that the execution of the contracts should be delayed until it is available.

### The Pomerene Bill for Control of Iron and Steel

The complications regarding sales to the Allies have served greatly to improve the prospects for the consideration of the Pomerene bill authorizing the Government to regulate the distribution and prices of iron and steel not only to the Allies but to private consumers in the United States. If this measure is constitutional, as is vigorously claimed by Senator Pomerene, it would provide all the necessary authority to carry out the plans outlined in the President's address to the producers of the country, issued a few weeks ago, in which he declared that private consumers as well as the Government were entitled during the war to prices representing no more than a reasonable profit to the producer. The attention of the Senate leaders has been concentrated during the past month upon the war revenue bill, in which Senator Pomerene has been specially interested, and it has not been found practicable to give the steel measure any consideration.

"I have not felt like urging upon the Interstate Commerce Committee my request for early hearings on my bill," said Senator Pomerene to the correspondent of THE IRON AGE, "because every member of the committee was required to be in daily attendance upon the sessions of the Senate which have been convened at 11 A. M., running until 6 P. M. without recess. It would not be practicable with so important a measure pending in the Senate to authorize our committee to sit during the legislative sessions, and obviously very little could be accomplished if the committee had but an hour to meet in the morning before the sessions. Now that the revenue bill is out of the way, however, we shall have time to consider this important question of regulating the steel industry, and I hope that hearings will be undertaken at a very early date. It is not my purpose to insist upon protracted hearings, as I think we can get at the salient facts in a few sessions. The points of information which I especially desire to have brought out can be supplied by a few witnesses and with the co-operation of the Federal Trade Commission, which already has a vast amount of material on the subject, I am sure we can make an early report to the Senate as the basis for prompt action on the bill.

W. L. C.

## Electric Smelting of Iron Ores in Northern Sweden

A proposition to install electric furnaces in the north of Sweden for smelting iron ore was put forward in March, 1916, by the committee appointed by the administration of the Association of Swedish Technologists. The committee recommended the installation of four plants with six furnaces in all, to produce 65,000 to 70,000 tons of pig iron per year, using from 110,000 to 120,000 tons of ore and about 25,000 tons of charcoal. J. A. Leffler recently made a report on this proposal which the *Jern-Kontoret's Annaler* published in an abridged form. An abstract follows:

In his investigation the author makes the assumption that to smelt one metric ton of pig iron from the Luleä or Gellivare ores, 1.6 tons of ore and 0.4 ton of charcoal are required and 0.272 kw.-year of electric current. As explained by him in detail, such a low consumption of current can only be attained by installing four furnaces of a total of 9000 kw., one as a stand-by and three working continuously, as this would make it possible to utilize 92 per cent of the purchased power while with one furnace only the useful percentage would only be 83 per cent., which is the average result attained during the three years working in 1913-1915 at the experiemntal plant at Trollhättan. There must be, however, a misprint in the figure given for the output of this plant for 1915; it should be 7502 tons instead of 7052 tons to make the author's calculations correct. The capital outlay at Luleä would be about £85,833 for the plant itself and about £20,833 for dwellings for officials and workmen, while for Gellivare the corresponding figures would be £94,444 and £23,333 respectively. There would be six officials and 75 workmen with their foremen, and the assumed output at each place would be 30,000 metric tons per annum. For the cost of production of one metric ton of electric pig iron the author submits the following estimates:

*Estimate of Cost of Producing One Ton of Pig Iron by Electricity*

| | At Gellivare | | | At Luleä | | |
|---|---|---|---|---|---|---|
| | £ | s | d | £ | s | d |
| 1.6 metric tons of ore* | 0 | 18 | 3 | 1 | 1 | 7 |
| Limestone | 0 | 0 | 8 | 0 | 0 | 5 |
| 0.4 metric tons of charcoal | 1 | 0 | 10 | 0 | 18 | 1 |
| 0.2 2 kw.-year | 0 | 14 | 5 | 1 | 0 | 4 |
| Electrodes | 0 | 1 | 10 | 0 | 1 | 8 |
| Repairs and upkeep | 0 | 3 | 8 | 0 | 3 | 4 |
| Wages | 0 | 6 | 6 | 0 | 5 | 5 |
| Management and sundries | 0 | 2 | 3 | 0 | 1 | 11 |
| Royalty | 0 | 1 | 5 | 0 | 1 | 5 |
| Sinking fund | 0 | 3 | 7 | 0 | 3 | 3 |
| Rents | 0 | 5 | 9 | 0 | 5 | 5 |
| Carriage to Luleä | 0 | 4 | 10 | .. | .. | .. |
| | 4 | 4 | 0 | 4 | 2 | 10 |

*50 per cent of ore and 50 per cent briquettes.

The freight from Luleä to Gävle and unloading the iron into railway cars would cost another 4kr., or 4s. 6d. per ton. It will thus be seen that the northern pig iron would cost at Gävle about £4 8s. per ton and therefore could not compete with the pig iron obtainable there from the blast furnaces at 65 to 70kr. (about 72s. to 77s. 6d.) per ton for basic, and at 70 to 75kr. (about 77s. 6d. to 83s. per ton for acid open-hearth pig iron.

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The Raccoon Gas Co., operating at Salem, Harrison County, W. Va., has filed an application with the public service commission for permission to increase its domestic rates from 17c. to 22c. per 1000 cu. ft., rates to religious and educational institutions from 12c. to 17c., and its manufacturing rates from 4c. to 5c. on old contracts and 15c. and 10c. on new contracts to 13c. for all gas used for manufacturing purposes.

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The Southern Pacific Railroad Co. has arranged for the immediate building of 10 locomotives at its shops at Roseville, Cal., and has ordered 55 to be constructed in the East.

# To Make $250,000,000 Worth of Artillery

## Colossal Task of Ordnance Bureau Includes Equipment of Some 12 New Establishments, Involving $30,000,000, for Forging and Machining Guns

WASHINGTON, Sept. 11.—How to secure the manufacture of $250,000,000 worth of artillery within the coming eighteen months in plants only part of which are now in existence is the colossal task to which the Ordnance Bureau is now addressing itself. Sixteen thousand guns ranging from 3-in. field guns to 9.5-in. howitzers must be shipped to the American forces in Europe as rapidly as possible and the shipments must be completed by March 1, 1919. The money for this enormous undertaking has not yet been provided by Congress, but it is included in the huge budget bill, the details of which are set forth in another column.

At least a score of plants well equipped to manufacture forgings or to machine and assemble guns must be kept continuously at work on this tremendous task. Counting the army gun foundry at Watervliet, N. Y., and the naval gun factory in Washington, there are less than half that number of plants in the United States equipped to do any important part of this work, and on the very threshold of the undertaking precious time must be spent in bringing about the extension of old plants and the establishment of new ones.

In preparing for war there are many tasks that can be accomplished in a few weeks, others that take months, and still others, like the manufacture of heavy ordnance, which consume years. It is estimated that if Congress, two years ago, had adopted recommendations made by the ordnance experts, not less than a dozen well equipped private establishments would today be in position to turn out all forms of light and heavy artillery as rapidly as transportation could be found for the guns. As it is, the officers of the bureau are straining every nerve to interest manufacturers in providing this absolutely essential material and are forced to meet the competition of the shipyards, the aeroplane factories, the motor truck builders, the railroads and the great mass of private consumers of iron and steel.

### At Least 20 Companies to Make Guns

The specific task which the Ordnance Bureau has undertaken is the mobilization of not less than twenty high-grade organizations for the production of gun forgings and machining and assembling of guns. The plants that have any experience in this work can be quickly enumerated. They include the Bethlehem Co., the Midvale Steel & Ordnance Co., the Driggs-Seabury Co. (now the Savage Arms Corporation), the General Ordnance Co., the American & British Mfg. Co., the Erie Forge Co., and the Crucible Steel Co.

The Bethlehem and Midvale companies have forged machined and assembled guns of all sizes and have supplied forgings for the other manufacturers. The Erie Forge Co. and the Crucible Steel Co. have also made gun forgings on a relatively small scale. The work of the other concerns mentioned has been limited to machining and assembling. These concerns taken together, ordnance experts declare, can produce but a small part of the mobile artillery required for the national army, and it therefore becomes necessary to induce other manufacturers to take up the work and to construct a number of forging and machining plants as large or larger than any now in existence. Thousands of men will be required to operate these establishments, and supervisory organizations embracing some of the best manufacturing talent in the country must be gotten together to direct the work.

As an initial step in this big development, the facilities of the Government for machining and assembling guns at the Watervliet, N. Y., arsenal will be more than doubled, but no attempt will be made at this establishment to produce forgings, which, as heretofore, will be procured from the Bethlehem and Midvale companies. Even more comprehensive changes will be made at the Watertown, Mass., arsenal, which heretofore has been confined chiefly to the building of gun carriages. At this arsenal extensive equipment will be installed for the making of forgings ranging in size up to 9.5-in. howitzers, which will be rough machined and heat treated. The final machining and assembling of the guns produced at Watertown will be accomplished in several private plants, and thus the facilities of this arsenal will be concentrated upon the production of forgings.

### $30,000,000 to Equip 12 New Establishments

The program of the Ordnance Bureau for the development of private plants not heretofore engaged in gun making includes the equipment of twelve new establishments, six of which will be devoted to making forgings, while the other six will be fitted up for machining and assembling. Of the allotment of $250,000,000 for the production of the artillery included in this project, $30,000,000 will be used to provide increased plant facilities at the twelve establishments referred to, approximately $5,000,000 being devoted to new buildings and $25,000,000 for machine tools. It is estimated that of the $30,000,000 spent on extensions and equipment, about one-half will be devoted to forging facilities and the remainder to equipment for machining and assembling.

### A Cost-Plus-Profit Basis

All contracts for the manufacture of guns in private plants under this project will be made on a cost-plus-profit basis. All the equipment the purchase of which is financed by the Government will remain the property of the United States, and it is assumed that when the war is over steps will be taken for its preservation to meet any possible emergency in the future. The new buildings will be constructed on standardized plans and will be made as nearly portable as the heavy requirements of the service will permit.

Three problems of overshadowing importance confront the Ordnance Bureau in this connection. One is the procurement of an adequate quantity of gun forgings; another is the manufacture of the necessary gages; while the third is the procurement of $25,000,000 worth of machine tools specially designed for the finishing of gun forgings. Each of these branches of the work presents serious problems, for the productive capacity of all manufacturers of these articles has been engaged for many months to come.

To secure a sufficient supply of gun forgings is proving a task of great magnitude and exceeding difficulty. Special steel of the most exacting requirements is needed, and all concerns capable of providing it are working on foreign orders in addition to their current output for the Ordnance Bureau. None of the six plants which are to be enlarged for this purpose has ever made gun forgings, although they all have excellent organizations, and with the necessary technical assistance will undoubtedly be able to produce forgings equal in all respects to the Ordnance Bureau requirements.

### The Gage and Jig Problem

The gage problem presents peculiar difficulties. As is well known, the War Department for many years has sought to secure Congressional authorization to procure sufficient gages, dies, jigs, etc., for installation in private plants to equip them to meet just such an emergency as has arisen, but without success. When Congress somewhat tardily provided a small sum for the manufacture of gages for the production of the Springfield rifle, it was found that the gage makers

had their hands full with other business, including foreign orders. Because of lack of equipment to manufacture the Springfield rifle in private plants as well as in the arsenals, the Bureau was forced to adopt the British Lee-Enfield rifle. It has long been a cherished project of the Ordnance Bureau to purchase and store gages for all the standard types of artillery used by the army, but Congress failed to provide the money, and now, with a small army on foreign soil, the War Department is making a desperate attempt to recover ground all but irretrievably lost.

The niggardly policy of Congress with respect to ordnance equipment in general has produced a startling result. When the United States was forced into the European war the entire equipment of the army in 3-in. guns, of which the greatest number are used in field operations, was less than 10 per cent of the standard requirements, while the number of mobile guns of larger caliber was practically negligible.

**$25,000,000 Worth of Machine Tools Needed**

The Ordnance Bureau realizes that it has no small task to go into the market to-day and secure early deliveries on $25,000,000 worth of machine tools. Yet these tools must be had and they must be ready for delivery the moment the enlarged plants are in shape to receive them. Experts now serving the Bureau who have had wide outside experience are confident that this equipment will be forthcoming and base their confidence upon a careful canvass of manufacturers which has been in progress for some time.

The appeals of the War Department to the manufacturers of the country for aid in meeting this great crisis have received a patriotic response. On every hand the Ordnance Bureau is receiving hearty cooperation, and requisitions for material are promised preference over all other work. The Priority Committee of the War Industries Board will assist the Bureau and preference will be given all private manufacturers engaged in producing ordnance in the way of shipments of steel, coal and other materials. The Bureau, however, has so perfected its own organization as to be in close touch with all branches of the steel trade and is in a position to secure preferential treatment without the interposition of the War Industries Board.

Even with the large measure of co-operation already obtained it will be at least six months before the plants now being equipped can begin deliveries, which, at the outset, will necessarily be confined to small caliber guns. It may be a year before production will be at a maximum, and until that point is attained and a large number of the heaviest guns are in place on the western battlefront the height of the efficiency of the American army in France will not be reached.

## Many Munition Workers Discharged

TORONTO, Sept. 9.—It is now clear in Canada that the munitions industry is reaching its close and business must readjust itself to conditions which will arise. The shell-making industry has been tapering off for some time past, but recent developments have upset most calculations, and the present outlook cannot be viewed without some degree of apprehension. The manufacturers have felt evidences of the gradual closure in shell orders and have been reducing their staffs. One of the largest Canadian plants has already dispensed with 1200 men. It is now definite, in many lines at least, that there are no new orders to be had, and the probability is that the number of workers to be released this fall will be very great. It is not possible to make a clear cut statement on the shell situation of Canada, as the Imperial Munitions Board at Ottawa has refused so far to make any official announcement. It is affirmed, however, that contracts are not being renewed in a large number of cases. Some manufacturers have recently received new orders, and are in a position to keep their plants operating indefinitely, but they are engaged in the manufacture of the larger shells. It has been reported that the manufacture of these shells only is to be continued. The ostensible reason is that there are large supplies ahead which have not been shipped overseas.

## The Concentration of Low-Grade Manganese Ores

The question of the commercial concentration of low-grade manganese ores so as to produce a high percentage ore for conversion into manganese-iron alloys is thus discussed editorially in the *Mining and Scientific Press* of San Francisco:

"In many places the common wet methods of concentration have been successfully applied. The log washer has been used in the Atlantic States, and jigging also has been employed with considerable success. Magnetic separation has long been used in the concentration of franklinite, and it may have been applied elsewhere. It would seem to offer an opportunity for helping to provide an increased output of desirable manganese ores from a number of relatively low-grade deposits. It would be easy to determine experimentally with a large average sample from any particular deposit precisely what amount of merchantable manganese concentrate could be recovered. The minerals highest in iron would be removable by developing a magnetic field of low intensity and subsequent concentration by fields of greater intensity would give products of decreasing iron content with a correspondingly higher percentage of manganese. Such plants, of course, would not be practicable without having large quantities of ore developed, but we have reason to believe that suitable deposits exist, both in Eastern and Western States. Fortunately the construction of magnetic separators is relatively simple, so that it would not be necessary to await the delivery of machines from manufacturers. Greater delay would probably be experienced in securing the needed crushing and sizing equipment. With 40 per cent ore selling at 90c. per unit, or $40.32 per gross ton, f.o.b., Chicago or Pittsburgh, it is evident that an ore with a concentration-ratio as low as 4:1 should prove profitable in almost any part of the country.

"While the chief demand originates in the East it must not be overlooked that 14 open-hearth furnaces are now in operation on the Pacific Coast, and that a great iron and steel plant is being erected in Washington. The continuance of the steel industry in the West now seems assured. The Noble Electric Steel Co. has responded to the call for ferromanganese by producing nine tons per day with a single furnace in its works at Heroult, Cal., and it has transformer capacity for making 25 tons of alloy daily. It is only the difficulty of securing electrodes from the East that limits the expansion of these operations. The demand for manganese is becoming more insistent on both sides of the continent, and he who contributes in any detail to the solution of the problem is doing a patriotic service to his country. In California psilomelane is found abundantly in the foothill counties from Tuolumne to Nevada, some of the deposits offering much promise."

## Wisconsin's New Law

The modified Wisconsin workmen's compensation act, passed by the 1917 Legislature, went into effect on Sept. 1, and applies to all industrial accidents occurring in Wisconsin after that date. The benefits to injured workmen are increased on an average of 10 per cent. The schedule of fixed benefits is changed so that periods of disability for all specific injuries involving amputations are materially lengthened. Indemnity for total disability, heretofore limited to six times the annual wage, has been increased. Maximum indemnity now allowed to workmen under 32 years of age who are totally disabled, is equal to a fraction less than 10 times the annual wage. Where death results from an accident the employer now is liable for the payment of burial expenses not to exceed $100.

**The Pulverized Fire Clay Co., Nelsonville, O., has been incorporated with $10,000 capital stock to mine and market fire clay. H. A. Hall is president and general manager. The company has acquired about 125 acres of fire clay lands. It expects to prepare its product chiefly for the use of the steel industry.**

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## Business After Peace

It has become a truism that war stimulates men's minds. Their vision is broadened, their courage is increased and they become more ambitious. That has been true of all wars; but it must prove vastly more so with this war, because it is largely a war of machinery and transportation. Other wars have involved fighting and strategy chiefly, while war is one of industry.

The world, in other words, is learning a great deal more about what can be done with materials. Railroad lines are built with a facility never dreamed of before. The "tanks," formerly a curiosity, have shown what they can do on rough country and will undoubtedly find much employment after the war. In a multitude of ways the war has forced the development of new implements and new ways of doing things, providing means by which the world can make vastly more rapid industrial progress.

It will not be fully appreciated until peace comes again how greatly man has increased his ability to conquer the forces of nature by the things that this war has developed. Coupled with these added facilities that are being furnished, there is the factor that the world is to be made safe for capital as well as for democracy. A period of unexampled world development will necessarily follow.

To the steel industry this outlook is of particular importance, for the demand for steel comes chiefly from development. The amount of steel that disappears in so-called "consumption" is small compared with the amount that is put into more or less permanent use, for the purpose of developing natural resources. The amount of steel now in employment in railroads of the United States, for instance, greatly exceeds the amount of iron and steel that has passed through the railroad use and has disappeared entirely or has been worked up again from the form of scrap. A census of all the iron and steel in the United States now performing a useful function would undoubtedly show more than one-half as much tonnage as has been produced altogether. The total amount of iron and steel in use in the United States to-day is undoubtedly more than three tons per capita, and it may be in excess of four tons. In many regions with natural resources that should be developed the amount is but a few pounds per capita.

For development, capital must be found, of course, but if the habits of economy and industry that are forced by the war continue, the capital will arise when the world has been made safe for capital. There is vastly less danger that there will not be great industrial activity after the war than there is that eventually it will overshoot the mark and produce a great industrial depression. It is a reasonable theory that industrial depressions are caused by the locking up of too much capital in investments that do not earn sufficient money in their early years. It will be one of the problems, in the years following the war, to develop means whereby the lesson of past experiences may be put to use and the expansion be kept within proper bounds.

Investment of capital in permanent structures does not occur when the tendency of prices is clearly downward. For the steel industry it will be necessary to develop prices in which investors will have confidence. Until recent months the common view was that the entire readjustment of iron and steel prices would occur after the war. Now it is clear that a part at least of the readjustment is to occur before the war ends, and that is a very good thing. The broad as well as the patriotic view is that profits after the war must be considered more than profits during the war.

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## Loyalty of Free Workingmen

The patriotic attitude of industrial workers which prevails to such a large extent during the present war in spite of the efforts of a few malcontents, may be impressively contrasted with the repression of wage earners during the Napoleonic struggle. Then the governing, manufacturing and farming classes fought Napoleon with one hand and dragooned the masses of their fellow countrymen with the other; patriotism was a class perquisite, bringing wealth to the few, and it was assumed that the working people would revolt if given an opportunity. In a volume entitled "The Town Laborer," by J. L. and Barbara Hammond, just published in England, the distressing conditions of the so-called working people in the period from 1760 to 1832 are described.

The *Economist* of London, in reviewing the book, says that one shrinks from using lightly the

word slave, but that no one can study the industrial period covered by this book and question the appropriateness of that word to describe the status of the workers. Then religious organizations found it their mission to offer to the downtrodden people the prospects of happiness in the next world as ample compensation for misery here. The abuse of children was one of the worst features of the industrial system of the time, and even Lord Melbourne, who was noted for acts of kindness to the young Queen Victoria, worked children in his mines from 6 o'clock in the morning until 8 at night. The English Government was in the hands of men who regarded the idea of citizenship of workmen as a challenge to their religion and their civilization. Law and order, according to their notion, were impossible unless the working classes could be kept in ignorance and in permanent subjection.

The *Economist* declares that among the lessons of the war, one has stood out every day during the past three years: that if the working classes of England had not, at a great price, won freedom for themselves, that country would speedily have collapsed under the stress of war. In this country, there has been little about which to complain concerning the attitude of workingmen toward the war and the enthusiastic patriotism of such organizations as the American Alliance for Labor and Democracy, which met in Minneapolis last week, is one of many evidences of the loyalty of the toilers and of the certainty that such organizations as the I. W. W. will not be allowed to continue their malicious and treasonable conduct. The fact remains, however, that nothing should be left undone to prevent interruption of manufacturing plants during the war period and the statement made by the National Industrial Conference Board at the meeting with Secretary Baker and other officials in Washington last week points the way for promoting complete harmony of all employers and employees who really are actuated by patriotic motives. If the recommendations made by the board, as summarized elsewhere in this issue of THE IRON AGE, are approved by representatives of the workingmen, industrial peace will be almost certain. The plan to prevent employees as well as employers from taking advantage of the existing abnormal conditions to change the standards which they were unable to change under normal conditions probably could be carried out without any more machinery, apart from strengthening the powers of the commission recently appointed to act under the Council of National Defense.

## Playing into Enemy Hands

The length to which advocates of the metric system will go in order to advance their propaganda is instanced by the following extract from a recent editorial in a New York newspaper:

> Dr. George F. Kunz, president of the American organization which is seeking to have the metric system introduced in American weights and measures, just as the corresponding decimal system has been introduced in American currency, has asked Secretary Baker to take a timely step in the direction of reform. He has invited the head of the War Department to have the new guns and other weapons of war made in accordance with the metric system. Dr. Kunz points out that nine of the ten countries of the entente manufacture their rifles and ordnance on the millimeter basis, and that American manufacturers and American soldiers, if called for service for or in France, would encounter grave difficulties because of this lack of a unified system of measurement.
>
> Dr. Kunz is right. It is high time America aligned itself with the nations that use the metric system. It is high time the archaic, cumbersome means of measurement gave place to the simple, orderly, almost automatic metric principle which has worked so admirably wherever it has been adopted.

Only those who have no conception of munitions manufacture could make such a suggestion as that quoted. Perhaps it should not be given serious attention. It is a safe guess that like many other metric enthusiasts, Dr. Kunz has no realization of even the present difficulty of securing adequate and accurate equipment of jigs, gages and fixtures. The metric advocates seem to care nothing about the main obstacle to the fulfilling of our manufacturers' contracts with the Allies. They apparently do not know that in the manufacture of rifles alone, not to consider the long list of other products, all of five years would doubtless be required for the complete change to the metric system in factory equipment and instruments, assuming the change to be desirable.

Certainly no news from the United States could give much greater joy in Berlin than that this country had decided to use from now on nothing but the metric system in manufacturing its military equipment. Probably the suggestion shows nothing more than ignorance of the complexities of manufacturing and ignorance of the disastrous effects of a wholesale change in shop standards. Its serious side is that it represents the readiness of groups of faddists to seize on the nation's necessity to promote private ends.

## Government Expenditures for Steel

That the prices the Government is to pay for steel constitute a very important question for the steel trade goes without saying, but the amount of discussion of it in the daily press dispatches from Washington suggests that the matter is a much more important item in the conduct of the war than is really the case. Secretary McAdoo's estimate is that the Government will require for the war for this fiscal year $10,750,000,000, plus $2,000,000,000 for contingencies, making a total of $12,750,000,000, apart from the money that has been loaned or is to be loaned to our Allies, set at $7,000,000,000.

The steel industry is operating at a rate of about 44,000,000 gross tons of ingots a year, which means about 33,000,000 gross tons of finished rolled steel. If the Government should absorb 15 per cent of this tonnage at an average price of three cents a pound the purchases would represent $330,000,000, or only 2.6 per cent of the total war expenditures. At 20 per cent of the output and four cents a pound the purchases would be $590,000,000, or 4.6 per cent of the total. Obviously the latter estimate is quite too high. The daily press has given the subject a prominence it hardly deserves in the economics of the war. The excess profits taxes the steel industry will pay the Government will certainly not come out of the Government's steel orders to any appreciable extent.

It is of especial interest to the steel and machinery trades, and particularly reassuring to the country as one of the Allies, that the United States, though entering on the extensive gun making pro-

gram mentioned in this and in several issues preceding, is buying from British and French gun makers. The important point is that these ordnance builders have supplied far beyond the number of field pieces which can be used in the lines now occupied on the west battle front and the American contracts allow them to maintain their organizations. The situation speaks for the impregnability of the fighting lines while our own forging and machine shops are being built and extended to swell the supply.

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A New York daily paper tells of the "soldiering" of workmen employed at $7.50 a day as carpenters at an army cantonment on Long Island. On a 20 x 50-ft. shack 40 men were found to be tacking down tar paper roofing. As the work seemed in danger of running out, the 40 kept on driving nails until the roof became actually armor-clad. The article quotes the reply of one of the slackers to a foreman's remonstrance, "Are you paying me or is the Government? What do you care?" Machine shops could be named where Government work is carried on with the same degree of patriotic interest on the part of many workmen. The contractors' cost plus arrangement with the Government has had to cover repeated advances to labor, after the word had been passed around that the Government was footing the bill. Also in cases of which details are known the diminution in the output per man has outdone all the performances in this line which were commonly recounted in the heyday of high-priced contracts for the Allies nearly two years ago.

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## The War Convention of Business at Atlantic City

Men who have been foremost in carrying out the war program of the Government will address the war convention of the Chamber of Commerce of the United States to be held at Atlantic City, Sept. 18 to 21. It is expected to be the most important and most largely attended convention of American business men ever held. Secretary of War Baker will tell what the Government further expects of business men in connection with the war, and Secretary of the Interior Lane will deliver one of the main addresses. Frank A. Scott, chairman of the War Industries Board, will explain the relation of the board to the industries of the country in providing supplies for the army and navy. Other addresses will be by Herbert C. Hoover, food administrator; A. C. Bedford, president Standard Oil Co.; George M. Reynolds, president Continental Commercial National Bank, Chicago; Boris Bakhmeteff, ambassador from Russia to the United States, and Lord Northcliffe, chairman of the British Mission.

A feature of the convention will be its division for part of the time into groups for the consideration of questions applying to different lines of manufacture and trade. Prominence will be given in the discussions to the adjustment of business in wartime to conditions produced by the war, also to readjustments after the war for which business must prepare. Questions of price control and priority will have attention, also industrial relations and employment problems and foreign trade, banking and credit in wartime. A special meeting of the national council of the Chamber of Commerce will be held at Atlantic City on Monday, Sept. 17, the day preceding the opening of the convention.

## Slump in Foreign Commerce

WASHINGTON, Sept. 11.—A heavy slump in both imports and exports was recorded during the month of July, according to the official statistics of the Department of Commerce. The embargo enforced by the Exports Council is undoubtedly responsible to a material extent for the decline in exports, and the details of iron and steel shipments for the month will be awaited with unusual interest.

The imports of merchandise for July, 1917, were valued at $226,000,000, a decrease of $81,000,000 compared with June, the high record month, but a gain of $43,000,000 over July, 1916. The imports for seven months ending July, 1917, were $1,779,000,000, against $1,469,000,000 in 1916. Free imports in July, 1917, were $158,000,000, and dutiable imports were $1,259,000,000. For 12 months ending July, 1917, the imports amounted to $2,703,000,000, against $1,915,000,000 in 1914. Exports of merchandise in July, 1917, reached the lowest record since February, 1916. For the month of July the exports of merchandise amounted to $374,000,000, against $575,000,000 in June, 1917, and $445,000,000 in July, 1916. For seven months ending July, 1916, exports amounted to $3,664,000,000, against $1,201,000,000 in 1914. The total exports for the 12 months ending July, 1917, were valued at $6,221,000,000, the high record for any 12-month period, against $2,358,000,000 in 1914, the 12 months preceding the breaking out of the war.

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## Steel Company's Proposed Additions

The Eddystone Steel Co., Crum Lynne, Pa., is contemplating making important additions to its plant. It is understood that new melting capacity is to be added, including one or two additional open-hearth furnaces, an electric furnace and tools. The equipment at present consists of one open-hearth furnace, one hammer, one 22-in. billet or bar mill and two 60-in. plate mills.

Several months ago, John E. Sullivan, who had been for some years a director and general sales manager of the Carpenter Steel Co., Reading, Pa., purchased the plant formerly operated by the Crum Lynne Iron & Steel Co., Crum Lynne, Pa., a suburb of Philadelphia, and adjoining the plants of the Baldwin Locomotive Works and the Remington Arms Co. at Eddystone, Pa., and has been operating it under the name of the Eddystone Steel Co.

It is now announced that Newell C. Bradley has been elected vice-president and works manager of the company. Mr. Bradley has been connected with the Midvale Steel Co. for 18 years, serving in many capacities and departments. At the time he severed his connection, he was assistant superintendent of the Nicetown plant.

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## Orders for Locomotives

Fewer orders for locomotives for domestic use appeared in August than in any month in some time, railroads ordering only six, of which five were electric. There was, however, heavy buying for export, principally by the United States Government, which ordered 764 locomotives from the Baldwin Locomotive Works. These locomotives are for service with the forces in France and are to be given preference over all other work. They are in addition to 300 ordered for the same purpose in July. Of the 764 locomotives 380 are to be of the 80-ton consolidation type. Total orders in August are estimated at 775, which, with the 448 in July bring the total for the first eight months of this year to 4751. Of these 1600 were for export, not including the 1164 ordered by the Government for use in France. Orders in 1916 were 5750, and in 1915 only 2300. Orders already placed in September include 65 locomotives for the Southern Pacific, 10 of which will be built in the company's own shops. Inquiries before the market amount to 55, of which the Minneapolis & St. Louis is negotiating for 25, the New York, New Haven & Hartford for 15, the Maine Central for 10 and the Chicago & Alton for 5.

## SHIPBUILDING ACTIVE

### Many Vessels Are Under Contract at Canadian Ports

TORONTO, Sept. 9.—Shipbuilding in British Columbia, which was started on a modern scale a few months ago, is now an important industry, and a number of contracts for the construction of ships have been received, the aggregate value of which is $27,000,000. These comprise steel steamers and wooden auxiliary vessels and will be constructed in the yards at Vancouver, Victoria, Port Coquitlam, New Westminster and Quatsino in the province of British Columbia.

Six steel steamers of 8,800 tons dead weight are to be built by J. Coughlan & Sons, Vancouver, three of which are already under construction. Five are for British account and one for Norwegian. The vessels will cost $1,250,000 each.

The original program at the Wallace shipyards, North Vancouver, was for six auxiliary power schooners, valued at $150,000 each. Four of these have been completed. In addition, one steel ship has been built and a second started while a third is to be built. These ships will represent an outlay of $650,000 each. The No. 2 yards of this company have been taken over by the Lyall interests of Montreal, Que., which will build six steamers for the Imperial Munitions Board at a cost of $350,000 each.

The Western Canada Shipyards on False Creek will build six wooden steamers for the Imperial Munitions Board, two having already been started. The aggregate value of these will be $4,500,000.

The British Pacific Engineering Co., Vancouver, has a ship construction program of about $1,500,000. The Taylor Engineering Co., Vancouver, has taken up the designing of ships and is building small ships of a total value of $300,000.

The Vancouver Shipyard & Engineering Works has located a yard on Burrard Inlet and will build ships for sale instead of on contract. The Whalen Pulp & Paper Co., with offices in Vancouver and pulp plant at Mill Bay on Howe Sound, Swanson Bay and Quatsino, west coast Vancouver Island, will build ships for its own use at Quatsino, and will lay two keels immediately. The Cameron Genoa Mills, Shipbuilders, Lt., Victoria, have launched four wooden auxiliary power schooners and will build two more to cost $150,000 each. They will also build four wooden steamers for the Imperial Munitions Board of a total value of $1,400,000.

The Foundation Co. has leased Turpel's shipyards at Victoria, and is constructing five ships for the Imperial Munitions Board at an aggregate cost of $1,750,000. Yarrows, Ltd., Victoria, is building four shallow draft vessels for river navigation in India.

The British Columbia Construction & Engineering Co. is establishing yards on Poplar Island, New Westminster, and will build four steamers for the Imperial Munitions Board to cost $1,400,000.

The Pacific Construction Co. has taken over the yards of the Coquitlam Shipbuilding Co., at Port Coquitlam, and will build two steamers for the Imperial Munitions Board to cost $700,000.

Harrison & Lamond, South Vancouver, have a contract to build an auxiliary schooner for the Dominion government for trade between the Pacific and the Atlantic to cost $150,000.

Other concerns having shipbuilding plans are the British Columbia Marine, The Sound Construction Co., the Victoria Machinery Depot and the Westminster Marine Ways.

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Frank Dallett, C. C. Bland and F. A. Dutton have recently incorporated under the name of the Warwick Steel & Iron Breaking Co., with main offices in the Harrison Building, Philadelphia, and a plant at Warwick, Pa. The company will deal in scrap material and has facilities for breaking large pieces of iron and steel. Frank Dallett of Dallett & Co., Philadelphia, has been engaged in the equipment trade for more than 30 years.

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## TAKES IMPORTANT STEP

### Shipping Board Will Require All Charters to Be Approved

WASHINGTON, Sept. 11.—The United States Shipping Board has taken the first important step looking to the assumption of complete control over the ocean-going merchant marine of the country by announcing that it will at once appoint a general chartering board to which all charters must be submitted for approval and intimating that existing ocean rates will be reduced by from 50 to 75 per cent. The board's action will be based upon the sweeping authority delegated to it by the act of Sept. 7, 1916, as amended by the Alexander law. The announcement of the board has created consternation among shipowners whose current charters have been made at rates from three to five times normal charges, and has been followed by a slump in steamship shares. Vessel owners are protesting vigorously in person and through their Senators and Representatives, but there is no reason to believe that the policy marked out by the Shipping Board will be in any way modified.

The chartering board will probably consist of three members and will sit in New York. To effectively control transatlantic shipping under the American flag, the board will probably formally requisition the great majority of merchant vessels, but after commandeering them, will return them to their owners for operation under a series of rules and regulations soon to be prepared and promulgated by the Shipping Board. In order that the supervision of transatlantic shipping may be as effective and as comprehensive as possible, the President has determined that a member of the Shipping Board or a designated representative of that body shall be added to the exports council. The coordination of these two bodies is of importance, as it will bring into close harmony the policy and general operations of both cargo and tonnage control. Especially, it will give the exports council a check upon the ocean-going carriers and enable it to determine readily whether its decrees are being closely observed.

It is probable that the drastic cuts in ocean freight rates to be made by the chartering board will be tentative and subject to readjustment from time to time. It is not intended to cripple steamship lines, but rather to stimulate them into the greatest possible activity. At the same time, in view of the comprehensive authority which Congress has voted the executive branch of the Government, the Shipping Board will be in position to secure a maximum of service from the entire American merchant marine quite irrespective of the profits allowed vessel owners. There is, however, no desire to render the business of owning and operating merchant ships unprofitable, and the board is fully alive to the fact that more can be done for the commerce of the country with the hearty co-operation of the vessel owners than under any system of commandeering and Governmental operation that could be devised. According to the information of the Shipping Board, transatlantic freight rates are now in the neighborhood of $17 or $18 per ton, and it is said that a maximum of about $13 will be fixed with a general average of not more than half that figure.

### Small Imports of Ferromanganese in July

Ferromanganese imports into the United States in July according to data furnished THE IRON AGE were only 2037 gross tons. The distribution was as follows: Through the port of Philadelphia, 887 tons; Baltimore, 400 tons; New Orleans, 750 tons, with New York and Norfolk reporting none imported. The July receipts are the lowest for any month this year, the next lowest having been May, with 2187 tons. The total to Aug. 1, 1917, is now 32,801 tons or 4686 tons per month. The average imports for the first four months of this year was 6190 tons per month, with the average in 1916 at 7577 tons per month. This is a falling off since April of 25 per cent in our imports.

## GRANTED WAGE INCREASE

### Sheet and Tin-Plate Workers Now Far Above the Scale

YOUNGSTOWN, OHIO, Sept. 10.—Examination of sales sheets completed here Tuesday shows black sheets selling on a 5c. card, an increase from 4.45c., thus advancing wages of sheet workers 16½ per cent. Tin plate during the last 60 days was selling on an average $7.75 a box, the prices advancing from $6.85. Wages were, therefore, increased 16 per cent. Both sheet and tin plate workers' wages now are about 85 per cent above the base.

#### A Peculiar Strike

One of the most peculiar strikes that has ever been noted in New England occurred last week in the plant of the Collins Co., Collinsville, Conn. About 125 men employed in the grinding room of that company went on strike after a request that the company buy coal and sell it to the men was refused because the company could not obtain it. The trouble was adjusted by granting an increase to the men which will pay for the winter's supply of coal, even at the prevailing prices, and by the assurance of the company that if the local dealers failed to supply the amount of coal necessary, the company would take steps to get it. At the present time, most of the Polish workmen employed in the grinding department are earning between $25 and $30 a week. This strike indicates the seriousness of the coal situation in many of the smaller places in New England.

#### News of Labor World

At a meeting of the minimum wage committee of the Bridgeport, Conn., machinists, held Sept. 7, it was decided to put into effect at once a demand on certain factories for an increase in wages. The local unions are maintaining much secrecy in regard to their plans, and it is understood that many meetings of shop crews are to be held this week. The four local union lodges have voted to pay strike benefits to the non-union machinists who are participating in the strike at the Lake Torpedo Boat Co.

The Pratt & Whitney Co., Hartford, Conn., a subsidiary of the Niles-Bement-Pond Co., has announced a monthly bonus of 12½ per cent above the regular wages, to be paid to its 3000 employees. More than one day's absence a month except in case of serious illness will debar a workman from participating in the bonus. As the present weekly payroll is about $60,000, the bonus payments will amount to about $30,000 a month.

The striking shopmen of the Boston & Maine Railroad are voting on the acceptance of an offer of the company to pay an advance of five cents an hour immediately and to submit the question of a further advance of three cents an hour to the decision of Henry B. Endicott, chairman of the Massachusetts Public Safety Commission, as arbitrator. The original demand of the men was for eight cents an hour increase, but it is believed that the present offer will be accepted and the men return to work. Nearly 4000 employees are involved.

### New Mill Placed in Operation

The Youngstown Sheet & Tube Co. started last week its new 12-in. mill built by the Morgan Engineering Co., Worcester, Mass. The mill started off very satisfactorily, and is designed to take steel billets up to 30 ft. in length from 1¾ x ¾ to 3 x 3 in. and reduce them to rounds, squares, flats and angles. The new mill is contained in a steel building 100 ft. wide by 401 ft. in length, and has a capacity of about 10,000 tons per month. On Feb. 5, this year, the Youngstown Sheet & Tube Co. put in operation a 9-in. Morgan bar mill designed to roll rounds, squares, flats and angles, with a capacity under normal operation of 6000 tons per month of average sections. An illustrated description of this mill appeared in THE IRON AGE of April 5, 1917.

## British Steel Exports and Imports Still of Fair Volume

British steel exports in June were 220,304 gross tons, excluding iron ore and including scrap. This compares with 199,418 tons in May of this year and 310,625 tons in June, 1916. The June exports are second in tonnage for the first six months of this year, the average to July 1 having been 206,164 tons per month as compared with 279,819 tons per month in 1916.

Pig-iron exports in June were 76,235 tons, against 60,644 tons last May and 66,150 tons in June, 1916. Ferroalloy exports in June, almost entirely ferromanganese, were 10,558 tons. The monthly average to July 1 has been 9,273 tons, as compared with 11,273 tons per month in the same period in 1916.

Rail exports in June were only 2,460 tons and were 11,943 tons less to July 1, 1917, than to July 1, 1916. Steel bar exports, which have been chiefly to France, continue to decline. In June they were 25,650 tons as compared with 19,537 tons in May, this year, and 59,188 tons in June, 1916. The total to July 1, 1917, or 170,619 tons is less than 50 per cent of the exports to July 1, 1916.

Imports of steel in June, excluding iron ore and including scrap, were 33,489 tons, an amount exceeded in but one month (May) since unrestricted submarine warfare started. The lowest month this year was March, with an importation of only 25,990 tons. Total imports to July 1 this year have been 202,176 tons against 401,281 tons to July 1, 1916. The monthly average to July 1, 1917, is 33,696 tons.

Imports of steel blooms, billets and slabs are rapidly declining. In June they were only 873 tons as contrasted with 11,223 tons in June, 1916. The total to July 1, 1917, has been only 20,614 tons as compared with 75,996 tons to July 1, 1916. Imports of steel ingots to July 1 this year were 3,089 tons; to July 1, 1916, they were 12,874 tons. Manganese ore and iron-ore import statistics have not been included in the official data for several months.

The extent of the war decline in imports can be appreciated by a comparison with those for 1913, when the average for the year was 195,264 tons per month.

## National Safety Congress in New York This Week

The National Safety Council is holding its sixth annual congress at the Hotel Astor, New York, this week. A general round table discussion was held on Tuesday afternoon, but the regular general sessions began on Wednesday with sectional meetings scheduled for the morning and afternoon of Wednesday, Thursday and Friday. The foundry section is to hold a meeting on Thursday morning and the iron and steel section on Thursday and Friday afternoons, as well as Wednesday afternoon. A session on safety matters in connection with automobile manufacturing is covered also by a special session with meetings on Friday morning and afternoon and the other sessions include three for the health and industrial relations division. In all the program includes 157 speakers.

Of the twenty-five directors elected to serve three years, G. L. Avery, secretary, Avery Co., Peoria, Ill.; J. M. Eaton, manager welfare department, Cadillac Motor Car Co., Detroit, and Earl B. Morgan, safety engineer, Norton Co., Worcester, Mass., were among those renominated, and the following were among those elected on the basis of fresh nominations: W. L. Chandler, Dodge Sales & Engineering Co., Mishawaka, Ind.; B. F. Tillson, superintendent, New Jersey Zinc Co., Franklin, N. J.; Charles R. Hook, vice-president, operating division, American Rolling Mill Co., Middletown, Ohio.

At the same time as the Safety Congress, in other words, throughout the week of Sept. 10, a Safety and Sanitation Exposition will be held at the Grand Central Palace, New York, under the joint auspices of the National Safety Council and the American Museum of Safety.

At the general meeting on Sept. 11, Lew R. Palmer, deputy commissioner of labor of Pennsylvania, Harrisburg, delivered his address as president of the National Safety Council. He emphasized the safety movement as "the entering wedge whereby a better understanding can be developed between the employer and the employee. With it," he said, "comes a frank admission of one vital problem, the solution of which works for their mutual benefit." Suggesting that the co-operative plan works for the good of all in this one instance, he holds it reasonable that the circle of application will grow. He deplored the fact that organized labor as a whole is still unorganized for safety, and one is short-sighted, he said, not to recognize in this field alone a work worth a lifetime of devotion. He referred to the remarkable increase in membership, 68 per cent in the year, in spite of the extraordinary conditions, and paid a tribute to W. H. Cameron, elevated a year ago from the position of secretary to general manager, and to R. W. Campbell, president for the first years of the council, and Arthur Morey, Mr. Palmer's predecessor.

## Installations of the Greaves-Etchells Electric Furnace

The Electric Furnace Construction Co. of Philadelphia announces the sale of the following Greaves-Etchells electric furnaces:

The American Radiator Co., Buffalo, N. Y., will install one 6-ton furnace.

The Singer Mfg. Co., New York, will install one 6-ton furnace.

The installation of these two furnaces makes a total of five of this type operating or contracted for in the United States.

Foreign orders for this furnace recently contracted for in England include a second order for a 6-ton furnace for the Stewart & Lloyd Co., Glasgow, Scotland; two 10-ton and one 6-ton furnace for Vickers, Ltd., of Sheffield for installation in Spain and one furnace for Hobson, Houghton & Co., Sheffield, for making tool steel.

## Steel Corporation's Orders Again Decline

The monthly statement of the United States Steel Corporation, showing unfilled orders on its books on Aug. 31, reveals a total of 10,407,049 tons. This is a decrease from the previous month of 437,115, the total on July 31 having been 10,844,164 tons. This is the fourth consecutive decrease since the record total of 12,183,083 tons on April 30, and is the smallest since last October. A year ago the unfilled orders were 9,660,357 tons and they were less than half the present total two years ago. The following table gives the unfilled tonnage of the United States Steel Corporation at the close of each month since January, 1914:

| | 1917 | 1916 | 1915 | 1914 |
|---|---|---|---|---|
| January | 11,474,054 | 7,922,767 | 4,248,571 | 4,613,680 |
| February | 11,576,697 | 8,568,966 | 4,345,371 | 5,026,440 |
| March | 11,711,644 | 9,331,001 | 4,255,749 | 4,653,825 |
| April | 12,183,083 | 9,829,551 | 4,162,244 | 4,277,068 |
| May | 11,886,591 | 9,937,798 | 4,264,598 | 3,998,160 |
| June | 11,383,287 | 9,640,458 | 4,678,196 | 4,032,857 |
| July | 10,844,164 | 9,593,592 | 4,928,540 | 4,158,589 |
| August | 10,407,049 | 9,660,357 | 4,908,445 | 4,213,331 |
| September | | 9,522,584 | 5,317,618 | 2,787,667 |
| October | | 10,015,260 | 6,165,452 | 3,461,097 |
| November | | 11,058,542 | 7,189,489 | 3,324,592 |
| December | | 11,547,286 | 7,806,220 | 3,836,643 |

## British Prices for Iron and Steel Scrap

Maximum prices for scrap steel in Great Britain were changed by the Minister of Munitions on Aug. 28, according to a cablegram from the American Consul General at London. The new order, cancelling previous orders, reads: Heavy steel melting scrap, £5 5s.; steel turnings and borings, £3½; steel turnings and borings mixed with wrought iron, £2½; all other classes of steel scrap mixed or not with wrought iron or other material, £5 5s. The following maximum prices were fixed for iron scrap: Wrought iron scrap, £5 5s.; wrought iron turnings and borings mixed with steel or other materials, £2½.

# Iron and Steel Markets

## GOVERNMENT BUYING

### Large Requirements Later in Shell Steel

#### Billets Yield Further and Some Finished Products Are Easier

Readjustment in iron and steel values is slow-paced and the Government situation is more complicated if anything. A significant fact is that representatives of some of the Entente Allies are again actively negotiating on their own behalf, indicating the suspension, for the time at least, of efforts to get steel for them through the War Industries Board at the prices to be fixed later for the Washington Government.

The Attorney General has given an opinion that manufacturer members of advisory committees may continue their activities at Washington, by declaring their interest in each Government contract that may be taken by their companies. The steel committee has not resumed its functions, however, as the opinion is considered vague on some points and machinery is lacking for complying with the conditions imposed.

There is a steady run of Government buying while the major war program is being worked out; Government purchases, in fact, make up the bulk of current business. Individual consumers, in the general belief that the market will continue to decline, are doing no buying that can be put off.

By the latest survey of Army and Navy needs, the mills will be called on to supply the Government far more shell steel than has been talked of in the great prominence given to ship plates. It develops also that some large shipments on shell steel contracts are yet to be made to Great Britain and that that country will buy a considerable additional amount of such steel from the United States.

Though a new plate mill at Pittsburgh is to start early in October and further new capacity will come in by Jan. 1, the tonnage of plates that will be required for Government ships, when projected yards begin building, will leave little or nothing for Japan. Meanwhile some of the Japanese plates may be taken from the mills and stored in the hope of getting them released.

Large requirements of fabricated steel for American operations in France are indicated by the placing of 100 steel buildings with the Blaw Steel Construction Co., Pittsburgh, calling for 11,000 tons. Thirty-two other buildings also for France, to be used as Army store houses, are pending. There is in addition $5,000,000 worth of steel buildings for the new gun making plants of private manufacturers in this country.

Italy is in the market for billets and various finished products and has offered $60 at mill for open-hearth steel. For eight vessels for Italy the American International Steel Corporation has asked for 15,200 tons of plates, 5600 tons of shapes and 800 tons of bars.

Recent Government purchases have included 4000 tons of rivets and some large bolt contracts are pending, one calling for twenty million bolts. The Government has added 14,000 kegs of nails at $3.20 to its recent purchases, these being for aviation camps.

There has been a further settling of prices for semi-finished steel. A sale of 4 x 4-in. open-hearth billets has been made at Pittsburgh at $65 and one of 2000 tons of open-hearth ingots at $60, delivered, netting $58 at mill. Sheet bars and slabs, however, have not been quoted below $75.

The tendency to lower prices is seen in bars as well as in plates in the Central West and to some extent in sheets. Sales of several lots of steel bars for delivery in the first half of 1918 have been made at 3.50c., Pittsburgh, and jobbers have bought for the last quarter of this year at 4c. Makers of agricultural implements have asked for prices for the first half of next year but mills have held off.

Pig iron resales are more frequent. Unconfirmed rumors have been widespread of the fixing of lower Government prices on pig iron and these may have prompted consumers' sales in the expectation that the iron could be replaced later on a lower basis. Generally pig iron prices have yielded $1 to $2 a ton. There have been $47 No. 2 Birmingham iron and $50 iron in the Middle West, and generally resale lots have been offered at about $2 under furnace prices.

The Government purchases of 15,000 tons of coke at $3.50 for foundry and $3 for furnace grades were made in July, though generally made public only in the past week. No indication of the price the Government will fix on blast furnace coke has been given. Prompt coke has sold in the past week at $13 to $13.50 at oven, and if a $3.50 or $4 price is to be fixed by the Government the pig iron market might be affected materially.

The buying of 77,000,000 lb. of copper for the Allies at 25 cents has been taken as pointing to the same price on the much larger contracts for the Government. Negotiations were not concluded on Tuesday as expected, in view of the reported contention made for a 2½-cent concession from the price to the Allies, a rather surprising abandonment of the one-price-for-all principle.

## Pittsburgh

PITTSBURGH, Sept. 11 (*By Wire*).

The steel trade is still waiting on the Government to announce its prices on steel, and the whole situation is about as quiet as it could possibly get. As time goes by, consumers seem more determined than ever not to buy a pound of material not positively necessary, but so far specifications against contracts are reported as being received at a fair rate. It is really remarkable how well prices have held up in the absence of practically any new buying. Pig iron has held steady in the past week, but there are still lower prices being named on soft Bessemer and open hearth billets, $65, Pittsburgh, having been done. A sale of 2000 tons of open-hearth ingots for September-October delivery at $60 per gross ton is reported. Prices on finished iron and

# A Comparison of Prices

**Advances Over the Previous Week in Heavy Type, Declines in Italics**

**At date, one week, one month, and one year previous**

**For Early Delivery**

| Pig Iron, Per Gross Ton: | Sept. 12, 1917. | Sept. 5, 1917. | Aug. 15, 1917. | Sept. 13, 1916. |
|---|---|---|---|---|
| No. 2 X, Philadelphia... | *$52.00* | $53.00 | $53.00 | $19.50 |
| No. 2, Valley furnace... | 52.00 | 52.00 | 53.00 | 18.50 |
| No. 2 Southern, Cin'ti... | 49.90 | 49.90 | 49.90 | 17.40 |
| No. 2, Birmingham, Ala. | 47.00 | 47.00 | 47.00 | 14.50 |
| No. 2, furnace, Chicago* | 55.00 | 55.00 | 55.00 | 18.00 |
| Basic, del'd, eastern Pa.. | 50.00 | 50.00 | 50.00 | 19.75 |
| Basic, Valley furnace.... | 48.00 | 48.00 | 52.00 | 18.00 |
| Bessemer, Pittsburgh.... | 51.95 | 51.95 | 55.95 | 21.95 |
| Malleable Bess., Ch'go*.. | 55.00 | 55.00 | 55.00 | 19.00 |
| Gray forge, Pittsburgh.... | 46.95 | 46.95 | 46.95 | 18.70 |
| L. S. charcoal, Chicago.. | 58.00 | 58.00 | 58.00 | 19.75 |

| Rails, Billets, etc., Per Gross Ton: | | | | |
|---|---|---|---|---|
| Bess. rails, heavy, at mill | 38.00 | 38.00 | 38.00 | 33.00 |
| O.-h. rails, heavy, at mill | 40.00 | 40.00 | 40.00 | 35.00 |
| Bess. billets, Pittsburgh. | *65.00* | 75.00 | 85.00 | 45.00 |
| O.-h. billets, Pittsburgh. | *65.00* | 75.00 | 85.00 | 45.00 |
| O.-h. sheet bars, P'gh... | *75.00* | 80.00 | 85.00 | 45.00 |
| Forging billets, base, P'gh | 100.00 | 100.00 | 125.00 | 69.00 |
| O.-h. billets, Phila..... | *85.00* | 90.00 | 100.00 | 48.00 |
| Wire rods, Pittsburgh... | 90.00 | 90.00 | 90.00 | 55.00 |

| Finished Iron and Steel, Per Lb. to Large Buyers: | Cents. | Cents. | Cents. | Cents. |
|---|---|---|---|---|
| Iron bars, Philadelphia.. | *4.935* | 5.185 | 5.159 | 2.659 |
| Iron bars, Pittsburgh.... | 4.75 | 4.75 | 4.75 | 2.60 |
| Iron bars, Chicago..... | 4.50 | 4.50 | 4.50 | 2.35 |
| Steel bars, Pittsburgh... | 4.00 | 4.00 | 4.50 | 2.60 |
| Steel bars, New York.... | 4.195 | 4.195 | 4.669 | 2.769 |
| Tank plates, Pittsburgh.. | 8.00 | 8.00 | 9.00 | 4.00 |
| Tank plates, New York.. | *8.195* | 8.945 | 10.169 | 4.169 |
| Beams, etc., Pittsburgh.. | 4.00 | 4.00 | 4.50 | 2.60 |
| Beams, etc., New York.. | 4.445 | 4.445 | 4.669 | 2.769 |
| Steel hoops, Pittsburgh.. | 5.75 | 5.75 | 5.75 | 3.00 |

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

| Sheets, Nails and Wire, Per Lb. to Large Buyers: | Sept. 12, 1917. Cents. | Sept. 5, 1917. Cents. | Aug. 15, 1917. Cents. | Sept. 13, 1916. Cents. |
|---|---|---|---|---|
| Sheets, black, No. 28, P'gh | 8.50 | 8.50 | 8.50 | 2.90 |
| Sheets, galv., No. 28, P'gh | 10.00 | 10.00 | 10.00 | 4.15 |
| Wire nails, Pittsburgh.. | 4.00 | 4.00 | 4.00 | 2.60 |
| Cut nails, Pittsburgh.... | 4.65 | 4.65 | 4.65 | 2.60 |
| Fence wire, base, P'gh.. | 3.95 | 3.95 | 3.95 | 2.55 |
| Barb wire, galv., P'gh.... | 4.85 | 4.85 | 4.85 | 3.45 |

| Old Material, Per Gross Ton: | | | | |
|---|---|---|---|---|
| Iron rails, Chicago..... | $44.50 | $44.50 | $40.50 | $18.75 |
| Iron rails, Philadelphia.. | 45.00 | 45.00 | 45.00 | 20.00 |
| Carwheels, Chicago..... | **33.50** | 31.50 | 30.50 | 11.75 |
| Carwheels, Philadelphia.. | *32.00* | 34.00 | 35.00 | 15.50 |
| Heavy steel scrap, P'gh. | *33.00* | 34.00 | 31.00 | 16.00 |
| Heavy steel scrap, Phila. | *30.00* | 31.00 | 31.00 | 14.75 |
| Heavy steel scrap, Ch'go. | **33.00** | 31.00 | 29.00 | 16.00 |
| No. 1 cast, Pittsburgh.... | 30.00 | 30.00 | 30.00 | 14.50 |
| No. 1 cast, Philadelphia.. | 32.00 | 32.00 | 33.00 | 16.00 |
| No. 1 cast, Ch'go (net ton) | 24.00 | 24.00 | 23.00 | 12.00 |
| No. 1 RR. wrot, Phila.... | 45.00 | 45.00 | 45.00 | 20.00 |
| No. 1 RR. wrot, Ch'go (net) | 36.00 | 36.00 | 33.50 | 16.50 |

| Coke, Connellsville, Per Net Ton at Oven: | | | | |
|---|---|---|---|---|
| Furnace coke, prompt... | *$13.00* | $13.50 | $16.00 | $2.90 |
| Furnace coke, future.... | 10.00 | 10.00 | 10.00 | 2.50 |
| Foundry coke, prompt... | *14.00* | 14.50 | 14.00 | 3.25 |
| Foundry coke, future.... | 12.50 | 12.50 | 10.00 | 3.50 |

| Metals, Per Lb. to Large Buyers: | Cents. | Cents. | Cents. | Cents. |
|---|---|---|---|---|
| Lake copper, New York. | **25.50** | 25.25 | 28.00 | 28.00 |
| Electrolytic copper, N. Y. | **25.50** | 25.25 | 28.00 | 28.12½ |
| Spelter, St. Louis..... | 8.00 | 8.00 | 8.50 | 9.00 |
| Spelter, New York..... | 8.25 | 8.25 | 8.75 | 9.25 |
| Lead, St. Louis..... | *9.50* | 10.12½ | 10.75 | 6.60 |
| Lead, New York..... | *9.70* | 10.25 | 10.87½ | 6.75 |
| Tin, New York..... | **61.37½** | 61.00 | 62.25 | 38.25 |
| Antimony (Asiatic), N. Y. | 14.50 | 14.50 | 15.00 | 11.00 |
| Tin plate, 100-lb. box, P'gh. | $12.00 | $12.00 | $12.00 | $5.75 |

steel are fairly strong, but there has not been enough new buying for the past month to test them out. It is known that stocks are running pretty low, and it is believed that just as soon as the Government announces its prices on steel, a fairly heavy buying movement may come very quickly. If reports are true that the Government intends to pay 25 cents for copper, this might indicate that prices on steel will not be fixed as low as some in the trade anticipate. About the only activity going is in blast furnace coke for prompt shipment, which is selling freely at $13 and $13.50 per net ton at oven. Some large Government orders for shafting, railroad spikes, rivets, sheets and other finished steel are about to be placed. In fact, Government buying has dominated the market for more than a month past, the amount of new buying from other consumers being almost negligible.

**Pig Iron.**—The local pig iron market is almost stagnant, the only sale reported in the past week being one of 400 tons of Bessemer, 100 tons a month for last four months of this year at the reported price of $51, Valley furnace. Nothing has been done on the Government inquiry that came out about a month ago for 40,000 tons of Bessemer iron for shipment to Italy, and this may fall through. It is said about 25,000 tons for this inquiry was gathered up, but the prices quoted were not satisfactory, and the negotiations were dropped. There is no new inquiry and prices are unchanged in the absence of sales. E. W. Mudge & Co. have blown out Claire furnace at Sharpsville, Pa., for relining and repairs.

We now quote as follows: Standard Bessemer iron, $50 to $52; basic, $48; No. 2 foundry, $52; malleable Bessemer, $52 to $53; and gray forge, $46 to $47, all at Valley furnace. The freight rate for delivery in the Pittsburgh and Cleveland districts from Valley furnaces is 95c. per ton.

**Billets and Sheet Bars.**—Prices on soft Bessemer and open hearth billets continue to decline, and more re-sale steel is being offered than the market will absorb. We note one sale of 1000 tons of 4 x 4-in. soft open-hearth billets at $65, Pittsburgh, and additional steel has been offered at this price or less. Reports are that a Chicago interest has offered Bessemer ingots on the basis of about $52, Chicago, or about $55, delivered Youngstown; but the concern credited with having sold this steel denies having done so. Reports are also current here that the Italian Commission with headquarters in New York City has been endeavoring to buy soft Bessemer and open hearth billets on the basis of $60, Pittsburgh, for shipment to Italy, but has not succeeded. There has not been as much decline in prices of sheet bars and large slabs as in billets, the differential now existing between billets and sheet bars and slabs being about $10 per ton. There is very little new demand for steel, as consumers are holding off, waiting for lower prices. We now quote soft Bessemer and open hearth billets at $65, Pittsburgh, and sheet bars and large slabs at $75, Pittsburgh. We quote forging billets at nominally $100 per ton for ordinary sizes and carbons, f.o.b. Pittsburgh, but there is no buying.

**Steel Rails.**—The Carnegie Steel Co. has not been a seller of either standard sections or light rails for more than a month, and a good part of the new business coming up in light rails is being taken by the re-rolling mills. However, the Carnegie company and also the Cambria Steel Co. are sold up on light rails and heavy sections for a good many months to come. Prices on new light rails and standard sections are given on page 627.

**Ferroalloys.**—It developed that the Electro-Metallurgical Co. of Niagara Falls, N. Y., the leading producer of 50 per cent ferrosilicon, has not yet fixed its prices for 1918 delivery, but is being strongly importuned by its customers to do so. The new demand for ferroalloys is not very active, consumers being covered over the remainder of this year. There was a recent sale of

250 tons of 80 per cent domestic ferromanganese at $350, delivered, for first quarter. We quote 80 per cent domestic ferromanganese at $375 to $400 for prompt shipment, and $350 delivered, for first half of 1918. We quote 18 to 22 per cent ferrosilicon at $80 to $82.50 per gross ton, delivered.

We quote 9 per cent Bessemer ferrosilicon at $89, 10 per cent $90, 11 per cent $95, 12 per cent $100, 13 per cent $105, 14 per cent $115, 15 per cent $125, and 16 per cent $135. We now quote 7 per cent silvery iron at $84 to $89, 8 per cent $85 to $90, 9 per cent $86 to $91, 10 per cent $87 to $92, 11 and 12 per cent $88 to $93. All f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having a uniform freight rate of $2 per gross ton for delivery in the Pittsburgh district.

**Structural Material.**—No new work is being given out in this district and local fabricators report they are sold up on on all the steel they can fabricate for the remainder of this year and are not actively bidding on new work. Mills are making better deliveries than for some time. We quote beams and channels up to 15 in. at 4c. to 4.50c., the lower price for last quarter on large contracts and the higher price on small lots for fairly prompt delivery. These are mill prices, while small lots from warehouse bring 5c. to 6c., depending on the order.

**Plates.**—Of the total orders for cars placed by the Government, the Pressed Steel Car Co. has taken 1800 composite steel gondolas, having wooden floors and sides, while its western interest, the Western Steel Car & Foundry Co., Chicago, has taken a Government order for 500 narrow gage cars. Steel car builders report that deliveries of plates and small shapes by the mills are very little better. The Pennsylvania Tank Car Co., Petroleum, Pa., has taken 100 steel tank cars for the Procter & Gamble Co., Cincinnati, and the Standard Steel Car Co. has taken 45 steel gondolas and 400 wooden box cars for the Government. A leading mill has taken 27,000 tons of sheared plates for shipment to the Pacific coast to be used by a boat builder for boats for the Government. We quote ¼ in. and heavier sheared plates at 8c. to 9c. for delivery over the remainder of this year. Small lots from warehouse bring 11c. to 12c., prices depending on sizes and the quantity wanted.

**Sheets.**—While prices on sheets remain fairly strong, consumers are having much less trouble in getting prompt delivery. Some mills that a month or more ago were refusing to quote are now seeking orders for all grades of sheets and promising deliveries in 60 to 90 days. There has been no actual decline in prices, except on galvanized, which are $2 to $3 a ton less than a month ago. Consumers of sheets are expecting a readjustment in prices to a much lower basis and are holding off from buying as much as they possibly can. The Navy Department recently placed about 7000 tons of Bessemer and open hearth black sheets at the tentative price of 5c. for No. 28 gage, subject to later adjustment. There has not been enough new buying in sheets for a month or more to actually test new prices. Prices on the different grades of sheets, which are only fairly firm, are given on page 627.

**Tin Plate.**—The committee appointed by the tin plate makers at the meeting held in Pittsburgh on Friday, Aug. 31, has sent out a general inquiry to tin plate manufacturers asking them to submit figures as to how much tin plate they expect to turn out in 1918, and how much will be available for packers of perishable foods and also non-perishable foods. It is assumed the committee desires this information to be used in a further conference to be held with Food Administrator Hoover, and also to get a general line as to the probable output of tin plate next year. As stated before, it is not believed the output of tin plate in 1918 will be much larger than this year, owing to the scarcity in labor and the fact that at present no new tin plate mills are being built. Packers of perishable foods are being furnished tin plate quite promptly, and it is not believed they will suffer very much for lack of plate for packing foods. Some former makers of terne plate have put in tinning pots and largely increased their output of bright plate. The Government's proposal to tin plate makers that they agree to sell their output for all of next year is not likely to be carried out. There is a good deal of hazard in doing this, and in previous years tin plate makers have met disaster in selling owing to sharp advances in steel, also in pig tin, and trouble in getting deliveries. No other makers of finished steel products sell for a year ahead, and tin plate makers say they should not be expected to do so. There is some export inquiry for tin plate ranging from 2000 up to 8000 and 10,000 boxes lots, but makers are not quoting, as they do not have the tin plate to spare. Several leading makers of tin plate have their entire output sold up into April, 1918. The new domestic inquiry is light, small lots of primes from stock selling at $12 up to $15 per base box. No sales of tin plate are being made to jobbers, except where they can show it is intended for packing perishable foods. Prices on terne plate are given on page 627.

**Iron and Steel Bars.**—It would seem that the market on both iron and steel bars is somewhat softer. Recently there have been sales of fairly large lots of steel bars for delivery over first half of next year at 3.50c., Pittsburgh. Sales also have been made to jobbers for last quarter of this year on the basis of 4c. at mill, and one leading producer of steel bars has covered its regular trade for last quarter of this year at 3.50c. at mill. Other makers are quoting for last quarter as high as 4.50c. at mill. The large consumers of iron and steel bars are well covered for the remainder of this year, but whether there will be a general desire to contract for first half of next year until the Government steel prices are settled is a question. The Government has been buying for months its steel bars at 2.50c. at mill, and is hardly likely to fix its price as high as 3.50c. Specifications against contracts are reported to be fairly active. The new demand for reinforcing bars is not very active, owing to the large falling off in building operations everywhere. The general market on steel bars is 4c. to 4.50c. at mill. Mill prices on carloads and larger lots on iron and steel bars on domestic orders are given on page 627.

**Hoops and Bands.**—The new demand is dull and only for small lots, consumers being covered over the remainder of this year, but specifications are not so heavy as some time ago. Prices on hoops and bands are likely to be lower, and consumers are buying very conservatively. Steel hoops in small lots for prompt shipment range from 5c. to 5.50c. and bands 5c. to 5.25c. at mill, extras on the latter as per the steel bar card.

**Wire Rods.**—The new demand is still active and there is also a good deal of export inquiry. One lot of 2000 tons of soft open-hearth rods for shipment to Denmark is about closed, the price netting the seller about $90, Pittsburgh. Small lots of soft Bessemer and open-hearth rods to domestic consumers are selling at $90 to $95 at mill. There is a fairly good demand for high carbon rods made from special steels, one lot of upward of 2000 tons being sold at $115, maker's mill. Prices on rods are given in detail on page 627.

**Wire Products.**—The domestic demand is dull and specifications against contracts are light. The consuming trade is not taking in any more nails and wire than is absolutely needed, owing to the uncertainty as to prices in the near future. It is not believed the present difference of $16 per ton in nails and wire can be maintained indefinitely, and the likely solution is that the independent makers will reduce their prices. There is considerable export demand for wire nails and wire for shipment to South America and other neutral countries. Recently about 4000 kegs of wire nails for shipment to South America was sold by a local maker netting about $5.10, New York. Jobbers are cutting down stocks as much as possible, in view of expected lower prices. The independent mills are running largely on contracts for wire nails on the $3.50 price and on bright basic wire on the $3.55 price. Very few nails have been sold at $4 or wire at the $4.05 basis. Prices on nails and wire of the independent mills, the American Steel & Wire Co. price being $16 per ton lower, are given on page 627.

**Shafting.**—Government demands for shafting are still heavy, and are likely to be very much larger in the near future. It is said the Government will shortly place orders with the makers for many thousands of tons of shafting, to be used in shells, nose pieces, adaptors

and for other purposes. The Government is now using very large quantities of adaptors in the inside of shells instead of detonators that were formerly used. So far it has paid market prices for all the shafting it has bought, but on the large lots yet to be purchased nothing is known as to what prices it will pay. The domestic demand for shafting is dull, and specifications are quiet. Consumers and jobbers believe prices of shafting will be lower when the Government announces its steel prices, and are buying very conservatively, trying to keep stocks as low as they possibly can. However, a few contracts have lately been placed for delivery in last quarter at 10 and 5 per cent off list. We quote discounts on shafting at 10 and 5 per cent off list, while occasionally very small lots are sold at list.

**Railroad Spikes and Track Bolts.**—New buying of spikes by the railroads is light, but they are specifying very freely against contracts placed some time ago. The Government has not been a large buyer of spikes since it placed its order some time ago for 53,000 kegs, but it is now in the market for about 3000 kegs of spikes and 1,000,000 or more tire plates for military use, presumably for shipment to France. The Jones & Laughlin Steel Co. will not move its spike plant to the South Side as originally intended, and is again making spikes. The new demand for boat spikes is very heavy. The Government allows the individual boat builders to place the orders for the spikes they will need for boats they are building for it. On these orders a slightly lower price is made than for other domestic business. The new demand for track bolts and spikes from railroads on former orders are heavy. Prices on railroad spikes and track bolts are reported firm and are given on page 627.

**Nuts and Bolts.**—The new demand is active due largely to direct buying by the Government, and also indirect orders that are coming from concerns doing Government work. It is expected that within a short time the Government will place several large orders, one being for about 20,000,000 bolts, and another for a smaller quantity. These orders are now being figured on with the Government, and will be divided among the larger manufacturers, who can get the material out and make prompt shipment. There is an embargo on nuts and bolts for export and nothing is being done. Prices are reported fair, and discounts that went into effect in April last are still being quoted, and are given on page 627.

**Cold Rolled Strip Steel.**—Makers report the new demand quiet, but specifications against contracts are coming in freely. Some Government orders are being placed, but these are not very heavy. Makers of cold rolled steel are quoting only for delivery to Oct. 31 next. It is said that while shipments on some contracts are being held up, there have been very few cancellations.

On contracts, mills are quoting 9c. at mill, but on small current orders prices range from 10c. up to 12c. at mill. Terms are 30 days, less 2 per cent off for cash in 10 days when sold in quantities of 300 lb. or more.

**Rivets.**—There is no new buying in rivets, but makers report that specifications are coming in actively. Government orders have been fairly heavy, and one recent order calling for 4000 tons for prompt shipment was divided among a number of the larger makers. Consumers believe that prices of rivets may be lower in the near future, and are buying very conservatively. Prices are reported firm, and we quote structural rivets at $5.25, and cone head boiler rivets at $5.35 per 100 lbs. f.o.b. Pittsburgh, for delivery over remainder of this year.

**Wrought Pipe.**—The current domestic demand is quiet, but mills are filled up for many months ahead. One leading maker of lapweld steel pipe is filled up for about 70 weeks, and other makers for six months or more. The demand for oil country goods is enormously heavy, but output is only fairly large, mills having to keep furnaces of butt and lapweld pipe to fill pressing orders. The subcommittee on tubular products has up to this time purchased about 20,000 tons of pipe for the Government, which has been distributed pro rata among the different manufacturers and shipments have been made with great promptness in all cases. The pipe manufacturers are responding splendidly and their cooperation has been of great advantage to the Government.

**Boiler Tubes.**—Conditions in the trade are unchanged, and makers of iron and steel tubes are filled up for eight months to a year ahead, and heavy premiums in prices are readily paid for either iron or steel tubes for prompt shipment. On seamless steel tubes, one leading maker is filled up for fully 18 months, and another maker for a year or more. There are no regular prices on iron and steel tubes, these depending entirely on the quantity involved and the delivery. Nominal discounts are given on page 627.

**Coke.**—Recently the Government came in to the market and bought 15,000 to 16,000 tons of furnace and foundry coke for delivery to different points all over the country. On part of this coke, shipping directions have been furnished and some of it has gone to West Virginia, Colorado and Illinois. The price paid by the Government was $3 for furnace and $3.50 on the foundry coke, per net ton at oven, the Government order having been divided among five or six of the larger operators. The new demand for blast furnace coke for prompt shipment is active and prices are holding up and are very firm. On Monday, sales of high grade blast furnace coke were made at $13 to $13.50 and there seems to be an active demand for all the prompt blast furnace coke that can be shipped. Other districts including Hanging Rock and Portsmouth, Ohio, have lately been buying coke in this market. There is still a shortage of labor and cars. When there is enough labor to get out a large quantity of coke, a car shortage develops, and when there are plenty of cars, usually there is a shortage in labor. None of these coke plants in the Connellsville region are operating for more than 75 per cent, and some at a less rate. We quote best makes of blast furnace coke for prompt shipment at $13 to $13.50 per net ton at oven, and 72-hr. foundry coke at $13.50 to $14 at oven. We note a contract for 1000 tons per month of foundry coke running up to July next year at $8 per net ton at oven. This is not strictly high grade coke, running somewhat high in sulphur. *The Connellsville Courier* gives the output of coke in the upper and lower Connellsville regions for the week ending Sept. 1, as 336,170 tons, a decrease over the previous week of 22,334 tons, due largely to the shortage in labor.

**Old Material.**—The local scrap market is almost stagnant, not enough material being sold by dealers to consumers to test prices. In fact, large consumers seem to be pretty well covered, and while agreeing that prices on scrap are low, they are not willing to buy. Dealers say there would be little trouble in getting cars if they could make sales of scrap, but they are unable to do so. Sales of about 300 tons of heavy steel melting scrap are reported on the basis of about $33, Pittsburgh. Dealers quote for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, as follows:

| | |
|---|---|
| Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered | $33.00 to $34.00 |
| No. 1 foundry cast | 30.00 to 31.00 |
| Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. | 38.00 to 40.00 |
| Hydraulic compressed sheet scrap | 25.00 to 26.00 |
| Bundled sheet scrap, sides and ends, f.o.b. consumers' mill, Pittsburgh district | 23.00 to 24.00 |
| Bundled sheet stamping scrap | 21.00 to 22.00 |
| No. 1 railroad malleable stock | 26.00 to 27.00 |
| Railroad grate bars | 18.00 to 19.00 |
| Low phosphorus melting stock | 42.00 to 45.00 |
| Iron car axles | 45.00 to 46.00 |
| Steel car axles | 45.00 to 46.00 |
| Locomotive axles, steel | 52.00 to 53.00 |
| No. 1 busheling scrap | 24.00 to 25.00 |
| Machine-shop turnings | 21.00 to 22.00 |
| Cast iron wheels | 31.00 to 32.00 |
| Rolled steel wheels | 36.00 to 37.00 |
| *Sheet bar crop ends | 41.00 to 42.00 |
| Cast iron borings | 22.00 to 23.00 |
| No. 1 railroad wrought scrap | 32.00 to 33.00 |
| Heavy steel axle turnings | 23.00 to 24.00 |
| Heavy breakable cast scrap | 24.00 to 25.00 |

*Shipping point.

## Chicago

CHICAGO, Sept. 10.

With the leading producer, specifications and new business, the latter including the requirements of the Government, have been lighter in the past week than in some time, and the most interesting feature of the market is presented by pig iron. The quotations for plates continue to range from 8c. to 10c., Pittsburgh, with deliveries somewhat easier to obtain. Local fabricators are doing very little and no structural lettings are reported. Shapes for delivery at mill convenience this year can be had at 4.50c., Pittsburgh, the price quoted for steel bars by independent producers, although one Eastern mill still quotes 6c., Pittsburgh, for shapes. For 1000 tons of special analysis bars, over 5c. was paid. Sheets show an easier tendency. Many consumers of pig iron appear to be banking strongly on the prospect that the Government will take steps to lower prices, inasmuch as they are offering iron for resale. As practically spot material, it is generally commanding the full market price, and some handsome profits have been made, one seller clearing about $40 per ton. Labor trouble, over-buying and other influences also have prompted the reselling. The only concessions offered by furnaces have been on off iron, of which they have lately been making excessive quantities, but some resellers have been willing to accept $47, Birmingham, for prompt No. 2 Southern iron. Where Southern makers have had any to sell for this year, they have asked $50, Birmingham. The Government has purchased 10,000 tons of foundry iron at well below the established market. Except for some buying of heavy melting steel and car wheels, in one or two directions, the old material market has been quiet.

**Ferroalloys.**—A sale of 100 tons of 80 per cent ferromanganese at $400, delivered, is reported. Quotations are unchanged at $400 for delivery this year, $375 for the first quarter and $350 for the second quarter. In some cases $400 has been cut to secure an order, but on the other hand some makers not only will not give concessions, but hold to the belief that the outlook is for greater strength, their opinion being based on the manganese ore situation.

**Pig Iron.**—The furnaces, fully engrossed with making deliveries against old contracts, are inactive so far as sales of standard iron are concerned, but resales, embracing practically every grade of iron, are going on at a lively rate. Labor troubles, overbuying, the attractive profits to be realized, and a belief that the Government may put iron prices at a much lower level than now prevail, have combined to cause consumers to place iron in the hands of brokers, and in this manner all grades have come on the market, including low phosphorus and charcoal. Inasmuch as these offerings are for prompt delivery, they have usually met with a ready acceptance at full market prices, although some Southern No. 2 soft has been let go at $47, Birmingham, or $51, Chicago. The makers have been asking $50, furnace, for this year, and $48 for first half. What inquiries have come to the trade have involved mostly deliveries within six weeks, indicating that melters are running close. The furnaces, both North and South, are making an abnormal amount of off iron, because of the inadequate supply of coke that comes to them and the poor quality of much they do receive. On off iron, the furnaces are showing a readier tendency to make concessions in price. Many of the Southern furnaces, in particular, are far behind in their deliveries. Makers of charcoal iron are not quoting except to regular customers, and if the present consumption continues, they expect a shortage. Western low phosphorus is obtainable at about $85, furnace, although about 200 tons of Lebanon low phosphorus brought nearly $90, delivered. Jackson County silveries range from $75 to $80, furnace. One of the largest inquiries in recent weeks for foundry iron is for 1000 tons, all of which is wanted quickly. It is learned that the Government recently distributed orders amounting to 10,000 tons to be supplied by producers in this district. The price was not given for publication, but it was below the level usually quoted, as might be expected. The Northern makers adhere to $55, furnace, for No. 2 foundry, basic and malleable Bessemer. The makers of steel castings are being offered more business than they can handle. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

| | |
|---|---|
| Lake Superior charcoal, Nos. 1 to 4 | $58.00 |
| Lake Superior charcoal, Nos. 5 and 6, Scotch and No. 1 soft or special | 60.50 |
| Northern coke foundry, No. 1 | 55.50 |
| Northern coke foundry, No. 2 | 55.00 |
| Northern coke foundry, No. 3 | 54.50 |
| Northern high-phosphorus foundry | 55.00 |
| Southern coke No. 1 f'dry and 1 soft | 55.00 |
| Southern coke No. 2 f'dry and 2 soft | 54.00 |
| Malleable Bessemer | 55.00 |
| Basic | 55.00 |
| Low-phosphorus | $85.00 to 90.00 |
| Silvery, 8 per cent | 77.75 to $2.75 |

**Plates.**—It is confirmed that business at 8c. has been done, but in a general way it cannot be said that the price situation is a great deal easier, as an Eastern mill continues to quote 10c., Pittsburgh, or 10.189c., Chicago. The mill in question, however, can make better deliveries of tank plates to domestic consumers as a result of the embargo on exports. The domestic demand is ample to absorb all that is offered, and many exporters are willing to take a chance on their ability to ship in the near future, but of the latter business the mills are chary.

For Chicago delivery out of stock jobbers quote 10c.

**Structural Material.**—No structural lettings are reported this week. Fabricators in Chicago are doing very little, but conditions no further away than Milwaukee are reported to be on a better basis because of several new plants and additions to factories. A local producer suggests 4.50c. to 5c., Pittsburgh, or 4.689c., Chicago, minimum, as the price for delivery some time this year, but the quotation of an Eastern maker is unchanged at 6.189c., Chicago. No cars are reported to have been placed, although the builders are figuring on Government inquiries on cars to be used in France. Jobbers quote 5c. for material out of stock.

**Bars.**—Some irregularity is to be found in steel bars, but it is certain that they are easily obtainable at 4.50c., Pittsburgh, or 4.689c., Chicago. For 1000 tons of special analysis bars placed in this district, over 5c. was paid. The agricultural implement interests are not yet active and doubtless will continue to hold off until price uncertainties are settled. For concrete reinforcing bars there has been more active inquiry. The quotations for rail carbon bars range from 4.25c. to 4.50c., Chicago, and iron bars from 4.50c. to 5c., Chicago. Jobbers' prices are unchanged.

We quote prices for Chicago delivery as follows: Soft steel bars, 4.50c.; bar iron, 4.50c. to 5c.; reinforcing bars, 4.50c., base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent to plus 10 per cent.

**Wire Products.**—Deliveries are slightly improved, and business has been a little heavier. The leading interest continues to quote on the basis of $3.20 for nails, with the independents still taking business at $4. We quote on the latter basis, per 100 lb. to jobbers:

Plain fence wire, Nos. 6 to 9, base, $4.189; wire nails, $4.189; painted barb wire, $4.339; galvanized barb wire, $5.039; polished staples, $4.339; galvanized staples, $5.039; all Chicago, carload lots.

**Sheets.**—Blue annealed are a little easier at 8.50c. to 8.75c., Pittsburgh, or 8.689c. to 8.939c., Chicago, for No. 10 gage, while No. 28 black range from 8.75c. to 9c., Pittsburgh, or 8.939c. to 9.189c., Chicago. No. 28 galvanized are about 10.25c. to 10.50c., Pittsburgh, or 10.439c. to 10.689c., Chicago. Specifications are good and some of the mills are getting to the point where they will need more business.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 10c.; No. 28 black, 10c., and No. 28 galvanized, 11.50c.

**Rails and Track Supplies.**—Small lots of standard section rails from stock have been sold at $95, Eastern mill. The quotation of the leading interest for stand-

ard railroad spikes is 4.25c., base, but it is well understood that this price is nominal, 5c. to 5.25c. being nearer the market. The following quotations are those of the principal producer, except in tie plates and spikes. Inasmuch as light rails are quoted at $30 and upward it is apparent how much out of line the nominal prices are. If they have any use to-day it is merely to indicate differentials.

Standard railroad spikes, 5c. to 5.25c. base; small spikes, 5.25c. to 5.50c. base; track bolts with square nuts, 5.25c., all in carloads, Chicago; tie plates, $40 to $90 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, $38, base; open hearth, $40; light rails, 25 to 45 lb., $65; 16 to 20 lb., $66; 12 lb., $67; 8 lb., $68; angle bars, 3.25c., base.

**Bolts and Nuts.**—Reports from the East indicate that bolt and nut makers on the Atlantic seaboard are doing an overwhelming business, but the West is admittedly quiet in regard to new business. For prices and freight rates, see finished iron and steel, f.o.b. Pittsburgh, page 627. Jobbers have advanced their quotation 50c. on nuts.

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅞ x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to ⅞ x 6 in., 40-2½; larger sizes, 30-5; hot pressed nuts, square, $2.50, and hexagon $2.50 off per 100 lb.; lag screws, 50 per cent off.

**Cast-Iron Pipe.**—No municipal lettings can be reported, business in that direction being at a standstill. Odd lots amounting to a few hundred tons have been placed at unchanged prices.

Quotations per net ton, Chicago, are as follows: Water pipe, 4 in., $68.50; 6 in. and larger, $65.50, with $1 extra for class A water pipe and gas pipe.

**Old Material.**—Except for some buying of heavy melting steel and carwheels the market has been quiet. Both sellers and consumers are inclined to view with conservatism the present uncertainties emanating from the probabilities of Government price fixing. Here and there, as demand for specific materials has developed, more strength is seen, but the advances are not radical. The B. & O. Railroad to-day is offering 2500 tons of old rails. Lists of moderate size are offered by the St. Paul, Wabash and C., St. P., M. & O. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

*Per Gross Ton*

| | |
|---|---|
| Old iron rails | $44.50 to $45.00 |
| Relaying rails | 50.00 to 55.00 |
| Old carwheels | 33.50 to 34.50 |
| Old steel rails, rerolling | 40.00 to 41.00 |
| Old steel rails, less than 3 ft. | 40.00 to 41.00 |
| Heavy melting steel scrap | 33.00 to 34.00 |
| Frogs switches and guards, cut apart | 33.00 to 34.00 |
| Shoveling steel | 30.50 to 31.50 |
| Steel axle turnings | 23.00 to 24.00 |

*Per Net Ton*

| | |
|---|---|
| Iron angles and splice bars | $44.00 to $45.00 |
| Iron arch bars and transoms | 45.00 to 46.00 |
| Steel angle bars | 32.00 to 33.00 |
| Iron car axles | 45.00 to 46.00 |
| Steel car axles | 41.00 to 42.00 |
| No. 1 railroad wrought | 36.00 to 37.00 |
| No. 2 railroad wrought | 33.00 to 34.00 |
| Cut forge | 32.00 to 33.00 |
| Pipes and flues | 23.00 to 24.00 |
| No. 1 busheling | 25.50 to 26.50 |
| No. 2 busheling | 17.50 to 18.50 |
| Steel knuckles and couplers | 37.00 to 38.00 |
| Steel springs | 40.00 to 41.00 |
| No. 1 boilers, cut to sheets and rings | 20.00 to 21.00 |
| Boiler punchings | 35.00 to 36.00 |
| Locomotive tires, smooth | 40.00 to 41.00 |
| Machine-shop turnings | 17.50 to 18.00 |
| Cast borings | 16.50 to 17.00 |
| No. 1 cast scrap | 24.00 to 25.00 |
| Stove plate and light cast scrap | 18.00 to 18.50 |
| Grate bars | 17.50 to 18.50 |
| Brake shoes | 19.00 to 19.50 |
| Railroad malleable | 31.50 to 32.50 |
| Agricultural malleable | 25.50 to 26.50 |
| Country mixed scrap | 18.00 to 19.00 |

## Philadelphia

PHILADELPHIA, Sept. 11.

Unless the Government or the coal operators act quickly, some of the mills in this district will face a serious coal shortage, with probabilities of shut-downs. A warning to this effect has been sent to Washington by manufacturers engaged on Government work. By Government order about 26,000,000 tons of gas coal have been diverted to the Northwest, and the Navy Department is taking large quantities for its own use. These factors and the shortage of cars are making it almost impossible for mills to get required quantities of fuel. It has been a common practice for many companies in this district to contract for from 50 to 75 per cent of their coal requirements, buying the remainder in the open market. It is now almost impossible to buy coal in the open market except in small quantities, as the coal companies are shipping every available ton to customers who have contracts. Very little bituminous has been sold at the $2 per ton price for run of mine fixed by the Government for this district. After several weeks of inaction, licenses for export of shapes to Japan are being issued, several shipments having gone forward during the past week. The placing of orders by the Government for fabricated material for building army storehouses in France was the most interesting development of the week in the finished steel market. Large orders for plates have been received by mills from the Emergency Fleet Corporation, and one mill, at least, has received sufficient business to keep going on Government work alone for two months. Eastern Pennsylvania foundry pig iron is slightly easier and No. 2 X can be obtained at $51, furnace. Small resale lots have been offered at about $2 per ton under the furnace prices.

**Pig Iron.**—Eastern Pennsylvania foundry iron is slightly weaker and No. 2 X can be had at $51 furnace, and No. 2 plain at about $50.25. Resale lots of Pennsylvania and Alabama foundry iron have been sold during the past week at about $2 under the prices quoted by furnaces. There is practically no demand for basic or Bessemer iron. A Western inquiry for 1500 to 2000 tons of standard low phosphorus iron for next year did not excite much interest. The same was true of a Pennsylvania inquiry for 500 tons of malleable iron. A fair tonnage of No. 2 Alabama iron was sold yesterday at $49, Birmingham, for nearby delivery. There is very little business, and what there is is confined largely to carload lots from large consumers for filling in, or from small users who seldom buy more than a carload at a time. Those who have contracts are urging deliveries and even asking furnaces to anticipate deliveries. As illustrating the general condition, it is stated that an inquiry of, say, 2000 tons would find furnaces willing to sell Pennsylvania No. 2 X foundry at $48, but in the absence of any buyers for such large tonnages, the furnaces have no difficulty in getting $51 for the small lots sold. Prices are as follows for these standard brands, prompt delivery in buyers' yards:

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|---|---|
| Eastern Penna. No. 2 X foundry | $52.00 to $53.00 |
| Eastern Penna. No. 2 plain | 51.25 to 52.25 |
| Virginia No. 2 X foundry | 53.75 to 54.75 |
| Virginia No. 2 plain | 53.25 to 54.25 |
| Basic | 50.00 |
| Standard low phosphorus | 90.00 |

**Coke.**—Sales of first-class foundry coke have been made during the past week at $13 to $14, ovens, for prompt delivery. Few, if any, contracts for foundry coke are being made. Furnace coke brings $13 for spot and $8.50 to $10 on contract.

**Billets, Etc.**—Billets, blooms and slabs show marked weakness. Though some mills have none to offer at any price, re-sale lots of open-hearth re-rolling billets are reported to have been offered at $85, and in some instances even lower. Mills quote $90 to $100, with $110 to $125 as the range on forging billets.

**Sheets.**—The demand in this market for sheets is not large, but specifications continue to come in for Government work at a good rate. Prices are weaker but unchanged on the basis of 8.50c. for No. 10 blue annealed, 8.50c. to 9c. for No. 28 black and 10.50c. to 11c. for No. 28 galvanized, Pittsburgh. Deliveries are easier. In some instances, almost prompt shipments can be made.

**Structural Material.**—There was considerable interest in the inquiry of the United States Government for approximately 27,000 tons of fabricated material for prompt shipment to France, there to be used in the construction of storage buildings for the Army. Bids were asked for steel for 32 buildings, each requiring 500 tons, and 110 buildings, each requiring 110 tons in a convenient run of sizes. Contracts for the 100 buildings,

totalling about 11,000 tons, were placed with several companies, the Blaw Steel Construction Co., Pittsburgh, taking a large share, but the 16,000 tons for the 32 buildings had not been let up to to-day. Licenses for shipments of shapes to Japan were obtained during the past week after several weeks of inaction. It is understood that Government officials maintain that there never has been an embargo on shapes to Japan, but exporters declare that they had been refused licenses up to last week. Japanese shipbuilding companies are said to be anxious to place further orders, but the disposition of the mills having sales offices here is to decline such business until the United States Government requirements are fully decided. The indecision at Washington is holding back several building projects which are now in architects' hands, as nothing will be done on building contracts until definite dates of delivery for steel can be ascertained. Plain material is weak at 5c., with 4.50c. being quoted for deliveries at mill convenience, which generally means next year.

**Plates.**—Plate mills in this district are facing a shut down because of lack of coal. Due to an order issued at Washington, nearly all of the gas coal has been going to the Northwest, where 26,000,000 tons are needed before the closing of navigation. Warning is said to have been sent to Washington by mills engaged on Government work that the coal shortage is serious and immediate relief must be afforded. The Emergency Fleet Corporation has sent out unusually heavy specifications for ship plates and a leading mill in this district received an order for sufficient rollings to keep it exclusively engaged on Government work for two months. A rumor that the embargo on export of plates to Japan would soon be raised was traced to the fact that the Japanese are depositing funds to obtain tonnages, which are to be stored until the question of shipment is determined. There is no softening of prices so far as mills are concerned, but reports of small resale lots are heard. A lot of 200 tons at 9c., with deliveries started in 60 days, was offered for resale last week. A mill refused a fair tonnage for export which it was offered at 9c. We continue to quote 10.185c. base, Philadelphia, for tank steel.

**Iron and Steel Bars.**—It is reported that a leading producer of steel bars has accepted contracts for 1918 on the basis of 3.50c., Philadelphia. A majority of mills ask 4.50c. for nearby delivery. Considerable business has been booked by one maker for fourth quarter delivery at 4.25c. The Government continues to take a generous part of the output of large sizes suitable for munitions, but on the smaller sizes, ¾ in. to 2 in., at least one producer can offer deliveries in about 30 days. The iron bar market is unchanged, the minimum quotation being 4.75c., Pittsburgh, while for small orders or for fairly prompt delivery 5c. is asked. Many jobbers have not placed their orders for fourth quarter.

**Ferroalloys.**—Ferromanganese continues firm, with $400 quoted for September delivery. Some ask this price for all of this year, but $375 can be done for fourth quarter. For the first half of 1918, quotations range from $350 to $375. A Cleveland concern is in the market for 4000 tons of spiegeleisen for delivery at the rate of 1000 tons a month over the remaining four months of this year. Quotations for spiegeleisen are $83 to $85, furnace.

**Old Material.**—Complaint has been made to the Pennsylvania Railroad Co. that its embargo on shipments of scrap material works an injustice to dealers as it reveals to consumers the names of producers from whom the dealers make their purchases. It is said that a number of small mills have gone direct to producers for their scrap, thus eliminating the scrap dealer or broker. Some dealers maintain, however, that diversion of trade in this manner is negligible and that it has always been possible for consumers to learn who the producers were by examining the freight bills, especially when material was sold while in transit. The market has been dull during the past week, and prices are lower. No. 1 heavy melting steel has declined $1; old car wheels $1 to $2; machine shop turnings from $1.50 to $2, and cast borings (for blast furnace use) $2. Prices per gross ton delivered in the Pennsylvania district are about as follows:

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|---|---|
| No. 1 heavy melting steel | $30.00 to $31.00 |
| Steel rails, rerolling | 43.00 to 45.00 |
| Low phosphorus heavy melting | 40.00 to 43.00 |
| Old iron rails | 45.00 to 47.50 |
| Old carwheels | 32.00 to 34.00 |
| No. 1 railroad wrought | 45.00 to 47.50 |
| No. 1 forge fire | 22.00 to 23.00 |
| Bundled sheets | 22.00 to 23.00 |
| No. 2 busheling | 16.00 to 17.00 |
| Machine shop turnings (for blast furnace use) | 16.00 to 18.00 |
| Machine shop turnings (for rolling mill use) | 20.00 to 21.00 |
| Cast borings (for blast furnace use) | 17.00 to 19.00 |
| Cast borings (clean) | 22.00 to 23.00 |
| No. 1 cast | 32.00 to 33.00 |
| Grate bars | 21.00 to 22.00 |
| Stove plate | 21.00 to 22.00 |
| Railroad malleable | 32.50 to 35.00 |
| Wrought iron and soft steel pipes and tubes (new specifications) | 30.00 to 32.00 |

## Cleveland

CLEVELAND, Sept. 11.

**Iron Ore.**—A large amount of ore was placed on Lake Erie docks during August. The docks on Sept. 1 held 6,705,672 gross tons as compared with 5,845,228 tons on the same date a year ago. Lake Erie docks received during August 7,898,816 tons of ore, as compared with 8,051,827 tons in August a year ago. Receipts for the season to Sept. 1 were 27,237,669 tons as compared with 30,274,731 tons during the same period last year. The receipts at Detroit, Lake Michigan and Canadian ports in August aggregated 2,289,434 tons, against 1,804,677 tons in August, 1916. Shipments from Lake Erie docks to interior furnaces in August amounted to 5,222,214 tons as compared with 5,391,692 tons in August, 1916. The total shipments from these docks up to Sept. 1 were 21,969,248 tons against 23,042,827 tons in the corresponding period last year. At a meeting of the Lake Carriers' Association held in Cleveland Sept. 10, which was attended by John H. Barnes, New York, director of the grain division of the Government's Food Commission, the rate of grain from ports at the head of Lake Superior to Buffalo was fixed at 4½c. for wheat for the regular season of navigation, which ends Nov. 30. The rate for December loading and storage will be fixed at a later meeting. The carrying charge agreed upon by Mr. Barnes and the vessel men is not as high as was paid last fall and is not quite equal to the wild rate that is being paid on ore. The present wild rate on ore is $1.60 a ton, gross. Grain shipments will be directed by the Government, but the brokers will handle the tonnage and will look after the loading of vessels as heretofore. The business which will be pooled will be handled by the Duluth Grain Chartering Corporation. We quote ore prices, delivered lower Lake ports, as follows: Old range Bessemer, $5.95; Mesaba Bessemer, $5.70; old range non-Bessemer, $5.20; Mesaba non-Bessemer, $5.05.

**Coke.**—Foundry coke is somewhat easier and there is more of a disposition among producers to take on contracts at the prevailing high prices. For a long time many producers refused to name a contract price. It is possible that the willingness to take on contracts has been stimulated by the expectation of lower prices that may follow Government regulation. Standard Connellsville foundry coke is quoted as low as $12.50 per net ton at oven for prompt shipment, but some producers are asking $14. The contract price ranges from $10 for the first half to $12 for delivery during the last quarter and first half, and $12.50 for the remainder of this year. Standard makes of furnace coke are quoted at around $13 for prompt shipment.

**Pig Iron.**—The market is unusually dull. The only demand is for small lots of foundry iron for early shipment. This is coming from consumers who either need a little more iron or who are not getting deliveries from the furnaces as needed. Shipping orders are heavy and some of the furnaces are behind on deliveries. This is attributed, at least partly, to the decreased production and the making of more off-grade iron than usual because of poor coke. Northern iron for early shipment is scarce, but a small quantity of resale Valley iron is being offered at $53, and Virginia iron is still to be had

for prompt shipment; carload lot sales of the latter are being made at $50, at furnace, or $53.20 delivered Cleveland, for early shipment. Some resale Southern iron is being offered in this market for early shipment at $47, Birmingham, for No. 2. This iron is being placed on the market by consumers in the Cincinnati territory who overbought at low prices. Southern furnaces continue to quote foundry iron at $50 for prompt shipment, and $45 to $50 for the first half. We quote, delivered Cleveland, as follows:

| | |
|---|---|
| Bessemer | $50.95 to $51.95 |
| Basic | 48.95 |
| Northern No. 2 foundry | 52.95 to 53.95 |
| Southern No. 2 foundry | 51.00 to 54.00 |
| Gray forge | 47.95 to 49.95 |
| Ohio silvery, 8 per cent silicon | 86.62 to 88.62 |
| Standard low phos. Valley furnace | 85.00 |

**Finished Iron and Steel.**—New inquiry in finished lines is quiet and the tendency toward an easing in prices is more apparent. Buyers generally are looking for lower prices and are placing orders only for immediate requirements. Implement manufacturers are inquiring for steel bar prices for the first half but are being held off. The delivery situation has become more serious than it has been at any time in respect to the regular trade, owing to the fact that the Government is taking so much of the output of the mills. One mill agency has closed fourth quarter contracts with its trade at 4c. for steel bars, 4.50c. for structural material and 8c. for plates. For early shipment steel bars are quoted at 4.25c. to 4.50c., Pittsburgh. Plates are easy, with quotations ranging from 8c. to 9c. by mills that are looking for business. On an early shipment inquiry for 2000 tons a Cleveland mill quoted the latter price. One inquiry has come out for 1500 to 2000 tons of structural material for an addition to the municipal electric lighting plant, Cleveland, and another for about the same tonnage of reinforcing bars for a terminal warehouse to be built in Cleveland by the Baltimore & Ohio Railroad. Bar iron prices are easier, and quotations now range from 4.25c. to 4.50c., Cleveland. Hard steel bars are quoted at 4c. to 4.25c. at mill. There is a heavy inquiry for sheets, but consumers generally are refraining from buying with the expectation that prices will be lower shortly and the market is weak. Quotations as low as 7.75c. are reported for No. 28 black sheets. Blue annealed sheets are quoted at 8.50c. for No. 10, and galvanized at 10c. to 10.50c. for No. 28. Additional Government business is being placed at 6.50c. for No. 28 black sheets. Warehouse prices on sheets are lower, owing to the fact that at least one local jobbing warehouse, apparently expecting lower prices and wishing to unload its stock, is quoting black and blue annealed sheets at 8.50c., and galvanized at 10.50c. Warehouse prices are 4.50c. and 5c. for steel bars and 5c. to 5.25c. for structural material.

**Bolts, Nuts and Rivets.**—New demand for bolts and nuts which has been quiet has improved, and some round lot business has been placed for Government work. Specifications on contracts are heavy. Makers are having great difficulty in getting their raw material from the mills. The Government opened bids yesterday for 4000 tons of rivets for the Navy Department. The rivet market has quieted down somewhat, no large inquiries having come out during the week. We quote rivets at 5.25c., Pittsburgh, for structural and 5.35c. for boiler rivets. Bolt and nut discounts are as follows, round lot buyers being allowed 5 to 10 per cent discount from these prices:

Common carriage bolts, ¾ x 6 in., smaller or shorter, rolled thread, 35 off; cut thread, 30 and 5, larger or longer, 20. Machine bolts, with h. p. nuts, ⅝ x 4 in., smaller or shorter, rolled thread, 40; cut thread, 35; larger and longer, 25. Lag bolts, cone point, 40. Square h. p. nuts, blank, $1.90 off list; tapped, $1.70 off list. Hexagon, h. p. nuts, blank, $1.70 off; tapped, $1.50 off. C. p. c. and t. hexagon nuts, all sizes, blank, $1.25 off; tapped, $1 off. Cold pressed semi-finished hexagon nuts, 50 and 5 off.

**Old Material.**—The market is very dull and weak. Mills are not buying and dealers are well covered on short sales. Scrap is being offered in increasing quantities and producers are making price concessions to move it. Heavy steel scrap is fully $1 a ton lower than a week ago and quotations on several other grades have been reduced. Heavy melting steel in Cleveland has been sold by a producer as low as $31.50, and has brought as high as $34 during the week. Difficulties in moving scrap have been added to by the issuing of an order by the New York Central lines to the effect that no cars shall be loaded for shipment until a special permit is secured for each car. We quote prices, f.o.b. Cleveland, as follows:

| *Per Gross Ton* | |
|---|---|
| Steel rails | $31.00 to $32.00 |
| Steel rails, rerolling | 44.50 to 45.50 |
| Steel rails, under 3 ft. | 34.00 to 35.00 |
| Iron rails | 42.50 to 43.50 |
| Steel car axles | 26.00 to 26.50 |
| Heavy melting steel | 32.50 to 33.50 |
| Carwheels | 30.50 to 31.50 |
| Relaying rails, 50 lb. and over | 49.50 to 54.50 |
| Agricultural malleable | 23.50 to 24.50 |
| Railroad malleable | 31.00 to 32.00 |
| Light bundled sheet scrap | 23.50 to 24.50 |

| *Per Net Ton* | |
|---|---|
| Iron car axles | $46.50 to $47.00 |
| Cast borings | 17.50 to 18.00 |
| Iron and steel turnings and drillings | 17.00 to 17.50 |
| No. 1 busheling | 26.00 to 27.00 |
| No. 1 railroad wrought | 40.50 to 41.50 |
| No. 1 cast | 26.00 to 27.00 |
| Railroad grate bars | 21.00 to 22.00 |
| Stove plate | 20.00 to 21.00 |

## Cincinnati

CINCINNATI, Sept. 11—(*By Wire*).

**Pig Iron.**—Hanging Rock furnaces have not formally opened their books again for next year, but recently a number of quotations have been put out on first half iron. Some figures on malleable and basic run as low as $51, Ironton, but foundry iron is held at a higher price on account of its scarcity. The top price named for the delivery mentioned is $54, furnace. Very little iron of any kind has been sold lately for first half shipment, but Northern furnaces as well as those in the South booked a substantial tonnage before the present dull period commenced some two months ago. An Indiana melter is inquiring for 600 tons of malleable for first half movement and there are a few inquiries out for foundry iron, but involving small tonnages only. Southern iron is moving slowly on contracts due to car and furnace troubles. A scarcity of the metal, together with the low production, is a difficulty that will become more serious if threatened labor disputes develop into a general strike of coal miners. Southern No. 2 foundry is sold in small lots for prompt shipment at $48, Birmingham, and higher. Some resale iron can be had at $47. It is also possible to buy some warrants below this figure, but the uncertainty of delivery does not make purchases of this kind attractive to the average melter. Some Virginia foundry has lately been sold near here, the average price being $45, furnace, for No. 2 X. The Ohio silvery irons are only in fair demand, with quotations unchanged. Standard Southern charcoal $54 to $55, Birmingham. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, for 1917 shipment, as follows:

| | |
|---|---|
| Southern coke, No. 1 f'dry and 1 soft. | $51.40 to $52.40 |
| Southern coke, No. 2 f'dry and 2 soft. | 49.90 to 50.90 |
| Southern coke, No. 3 foundry | 49.40 to 50.40 |
| Southern coke, No. 4 foundry | 48.90 to 49.90 |
| Southern gray forge | 48.90 to 49.90 |
| Ohio silvery, 8 per cent silicon | 87.26 to 91.26 |
| Southern Ohio coke, No. 1 | 55.76 to 56.26 |
| Southern Ohio coke, No. 2 | 55.76 to 56.26 |
| Southern Ohio coke, No. 3 | 54.76 to 55.26 |
| Southern Ohio malleable Bessemer | 55.26 to 56.26 |
| Basic, Northern | 56.26 to 57.26 |
| Standard Southern charcoal | 56.90 to 57.90 |

**Finished Material.**—Buyers of structural material is mostly of the hand-to-mouth variety, although the warehouses had a little spurt last week that made the total for the week show up better than for any week within a month. Iron and steel bars are unchanged at 5c., twisted steel bars 5.05c. Plates, ¼ in. and heavier are quoted at 10c. and No. 10 blue annealed sheets at 10c., base. The warehouse price on wire nails is $3.90 per keg, base, and on barb wire 5c. a pound. The mill price on No. 28, galvanized sheets is 10.65c., Cincinnati or Newport, Ky., and on No. 28 black 8.65c. The mills are devoting their attention to shipping on old contracts and are making few new contracts. The mill supply business is holding its own very well. The demand for high

speed tool steel is good and no changes have been made in prices that have prevailed for the past year.

**Coke.**—The situation is somewhat complicated. Reports as to Government regulation of prices do not appear to have any foundation, but their circulation has tended to further disturb the market. In the Connellsville field, prompt foundry coke is quoted all the way from $13 to $15, and for future shipment around $11 to $12.50. These figures by no means represent the reduction that was looked for after the adjustment of coal prices. The Wise County and Pocahontas operators are holding out for the same prices as now prevail in the Connellsville district. New River prices range from 50c. to $1 a ton higher. Shipments are still badly delayed, but a little improvement was noted last week. Furnace coke is very quiet and is obtainable around $9 to $10 per net ton at oven for future shipment.

**Old Material.**—Business is still very light, and prices have been reduced on a great many different grades of scrap. Foundry operators are melting more scrap than heretofore, but are making their purchases in carload lots only. Railroad offerings are on the increase. Delays are reported on shipments east of the Ohio River. The following are dealers' prices f.o.b. at yards Cincinnati and southern Ohio:

*Per Gross Ton*

| | |
|---|---|
| Bundled sheet scrap | $19.50 to $20.00 |
| Old iron rails | 33.50 to 34.00 |
| Relaying rails, 50 lb. and up | 45.50 to 46.00 |
| Rerolling steel rails | 36.00 to 36.50 |
| Heavy melting steel scrap | 31.00 to 31.50 |
| Steel rails for melting | 32.00 to 32.50 |
| Old carwheels | 29.00 to 29.50 |

*Per Net Ton*

| | |
|---|---|
| No. 1 railroad wrought | $31.00 to $31.50 |
| Cast borings | 13.50 to 14.00 |
| Steel turnings | 13.50 to 14.00 |
| Railroad cast | 21.50 to 22.00 |
| No. 1 machinery cast | 25.00 to 25.50 |
| Burnt scrap | 14.50 to 15.00 |
| Iron axles | 44.00 to 44.50 |
| Locomotive tires (smooth inside) | 37.00 to 37.50 |
| Pipes and flues | 17.50 to 18.00 |
| Malleable cast | 22.50 to 23.00 |
| Railroad tank and sheet | 16.00 to 16.50 |

## Birmingham

BIRMINGHAM, ALA., Sept. 11 (*By Wire*).

The Southern pig iron market, while still weak, shows no inclination to make concessions on prices, sales still being recorded in small lots on the $50 basis for No. 2 foundry, this year delivery, and $48 for next year. A buying movement is not expected until the Government prices are fixed.

(*By Mail*)

Weakness of the pig iron market in the South is still admitted. A few sales of high silicon iron sold recently, in small lots, as high as $53 per ton, while some sales of special brand and special analysis irons brought $51 and $52 per ton, delivery during the rest of this year. Reports as to some iron having been sold in the South under $47 per ton, No. 2 foundry basis, were verified as to about 12,000 tons, and the statement is made that this iron was a resale of iron proposed for export, some of it to have gone to Sweden, but stopped by the Government. Apprehensions on the part of the iron manufacturers in the Southern territory because of threatened labor troubles in the coal mining section have been allayed for the time being. It is not believed that the miners will renew demands so positively in the near future and that all operations will now continue as before. Deliveries of iron have been so steady that one of the companies in Birmingham announces a reduction of its accumulation from 120,000 to a little more than 60,000 tons during this year. Production of iron in August showed a little above 500 tons more than in July. Usual quotations by furnaces for prompt delivery are as follows:

| | |
|---|---|
| No. 1 foundry and soft | $50.50 to $51.50 |
| No. 2 foundry and soft | 50.00 to 51.00 |
| No. 3 foundry | 49.50 to 50.50 |
| No. 4 foundry | 49.25 to 50.00 |
| Gray forge | 49.00 to 50.00 |
| Basic | 50.00 to 51.00 |
| Charcoal | 55.00 to 56.00 |

**Cast Iron Pipe.**—Steady melting is going on at cast iron pipe plants in this district, municipal orders in the main requiring attention. The United States Cast Iron Pipe & Foundry Co. has still much of the Argentina order to fill, transportation facilities not being up to all expectations on the business. Prices are unchanged, net ton, f.o.b. yards, $63 for 4-in., $60 for 6-in. and upwards.

**Coal and Coke.**—Production of coal is again about normal following the stormy sessions of a convention of the United Mine Workers of America, Alabama District No. 20, at which repudiation, practically, of the agreement made on the suggestion of Secretary of Labor Wilson took place and a delegation was sent to Washington to seek Government assistance in getting some relief under the demands of the miners and mine workers. All men were instructed to return to work and there has been obedience to the order. The coke production will be normal again in the next few days, but producers will not consider any new contracts until all contentions are of the past. Coke prices are around $12.50 per ton, foundry coke, and $8 to $10 on furnace coke.

**Old Material.**—Dealers in scrap note some improvement in conditions, but do not expect for a while the same conditions as prevailed a couple of months since. Several increases in prices are noted in the last week or so. Heavy melting steel, one of the popular products, has taken on an advance of $1 and stove plate a $2 advance. Quotations, f.o.b. dealers' yards, are given as follows:

| | |
|---|---|
| Old steel axles | $32.00 to $33.00 |
| Old steel rails | 24.00 to 25.00 |
| No. 1 wrought | 27.00 to 28.00 |
| Heavy melting steel | 21.00 to 22.00 |
| No. 1 machinery | 24.00 to 25.00 |
| Car wheels | 23.00 to 24.00 |
| Tramcar wheels | 20.00 to 21.00 |
| Stove plate | 19.00 to 20.00 |
| Shop turnings | 11.00 to 12.00 |

## St. Louis

ST. LOUIS, Sept. 10.

**Pig Iron.**—A good many melters are finding that they are not fully covered for the last few months of the year, and these are the ones now making the purchases at spot prices. The aggregate sales for the week will probably run 2000 tons, all in 100-ton lots and less, and include a number of special analysis sales made on offers to melters. Ferromanganese has been sold in carload lots at $400 per ton for quick shipment. No. 2 Southern foundry for spot delivery is hanging around $50 with last quarter delivery at $48 per ton, Birmingham basis.

**Coke.**—In coke the business is all of a spot character and the price prevailing during the past week has been about $13.50, Connellsville, for best selected 72-hr. coke. No deferred contracts have been made. On 48-hr. coke the price is held at approximately the same figure as 72-hr. and practically none is being sold, the contracts already made covering this division of the business for this section. By-product coke continues in a sold-up condition.

**Finished Iron and Steel.**—In finished products, no new business has appeared, the mills practically declining to take it. The consumers, however, are pressing for deliveries on their contracts and are not getting all the satisfaction they would like. Light rails are selling in small quantities to the coal companies at $70 per ton base, but the lumber companies are taking nothing. Structural material is out of the market for the present from the practical standpoint, with deliveries extended to the late second quarter of 1918. No standard section steel rails are being sought under new contracts, but the railroads are urging forward without much success the rails they have already ordered. Track fastenings are in long deferred delivery, even to the last half of 1918. Stock out of warehouse is being moved up to capacity. For stock out of warehouse we quote as follows: Soft steel bars, 4.55c.; iron bars, 4.50c.; structural material, 5.05c.; tank plates, 10.05c.; No. 10 blue annealed sheets, 10.05c.; No. 28 black sheets, cold rolled, one pass, 10.35c.; No. 28 galvanized sheets, black sheet gage, 11.75c.

**Old Material.**—In scrap the feeling is better and the dealers are trading among themselves to some extent to meet their requirements on contracts already made with consumers, but there is not as yet any definite buying movement in the market. The feeling of the dealers is that a better market is coming, and in consequence none is willing to make any sales save on stock immediately available on which they can take a profit. They are not desirous of committing themselves ahead. Lists out during the week included one from the Wabash of 2000 tons and one from the Union Pacific of 1200 tons. The other roads in this market are peddling out their old material in small lots as they pick it up or get it under shipping control. These transactions are largely by telephone and do not assume the importance of list bids. We quote dealers' prices, f.o.b. customers' works, St. Louis, industrial district, as follows:

| | *Per Gross Ton* |
|---|---|
| Old iron rails | $40.25 to $40.75 |
| Old steel rails, re-rolling | 38.00 to 38.50 |
| Old steel rails, less than 3 ft. | 37.00 to 38.00 |
| Relaying rails, standard section, subject to inspection | 50.00 to 55.00 |
| Old car wheels | 30.00 to 30.50 |
| No. 1 railroad heavy melting steel scrap | 29.00 to 30.00 |
| Heavy shoveling steel | 29.50 to 30.00 |
| Ordinary shoveling steel | 26.00 to 26.50 |
| Frogs, switches and guards cut apart | 29.00 to 30.00 |
| Ordinary bundled sheet scrap | 18.50 to 19.00 |
| Heavy axle and tire turnings | 20.00 to 21.00 |

| | *Per Net Ton* |
|---|---|
| Iron angle bars | $38.50 to $39.00 |
| Steel angle bars | 29.00 to 30.00 |
| Iron car axles | 41.00 to 41.50 |
| Steel car axles | 40.00 to 40.50 |
| Wrought arch bars and transoms | 41.50 to 42.00 |
| No. 1 railroad wrought | 35.50 to 36.00 |
| No. 2 railroad wrought | 33.50 to 34.00 |
| Railroad springs | 31.50 to 32.00 |
| Steel couplers and knuckles | 37.50 to 38.00 |
| Locomotive tires, 42 in. and over, smooth inside | 39.00 to 39.50 |
| No. 1 dealers' forge | 26.50 to 27.00 |
| Cast iron borings | 16.50 to 17.00 |
| No. 1 busheling | 25.00 to 25.50 |
| No. 1 boilers, cut to sheets and rings | 19.50 to 20.50 |
| No. 1 railroad cast scrap | 21.00 to 21.50 |
| Stove plate and light cast scrap | 16.00 to 16.50 |
| Railroad malleable | 29.00 to 30.00 |
| Agricultural malleable | 24.00 to 24.50 |
| Pipes and flues | 22.50 to 23.00 |
| Heavy railroad sheet and tank scrap | 18.00 to 18.50 |
| Railroad grate bars | 18.50 to 19.00 |
| Machine shop turnings | 17.50 to 18.00 |
| Country mixed scrap | 16.50 to 17.00 |

# British Steel Market

## Allied Demand for Tin Plate Is Strong—America Asking for Ferromanganese

(*By Cable*)

LONDON, ENGLAND, Sept. 12.

**Cleveland pig iron is quieter but hematite iron is in strong demand. Tin plates are firm and there is a constant Allied demand with offers limited. American semi-finished steel is idle. Ferromanganese is nominal with America still inquiring and sellers lacking. We quote as follows:**

Tin plates, coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, maximum, 30s.

Ferromanganese, £45 nominal.

Ferrosilicon, 50 per cent, c.i.f., £35 upward.

On other products control prices are as quoted in THE IRON AGE, of July 19, p. 171.

# Buffalo

BUFFALO, Sept. 10.

**Pig Iron.**—Shortage of coke and the inferior quality of much of the supply of that commodity now being received are causing some apprehension among furnacemen that full furnace output will be jeopardized unless improvement in coke receipts is soon brought about, and that if the present situation continues, shipments on contracts will have to be curtailed, although demand is urgent, as there will not be sufficient iron to go around. Apparently coke cannot be obtained in sufficient quantities, even at $13.50 per ton. The tonnage of new business being placed is almost nil, furnaces not caring to take on future commitments and buyers having stopped ordering, awaiting Governmental price adjustment. Prices on such business as is transacted are maintained on the basis current for the past few weeks. The Government has distributed several additional orders of moderate tonnages among the furnaces of the district, for Navy Yard use, at prices to be determined later. The new furnace of the Donner Steel Co., Buffalo, went into blast on Aug. 22, and both of the Buffalo furnaces of that company are now running on basic iron. Prices are more or less nominal, in the absence of new business in any volume, and are quoted unchanged from last week's report, as follows, for last quarter and first half delivery, f.o.b. furnace, Buffalo:

| | |
|---|---|
| High silicon irons | $55.00 to $56.00 |
| No. 1 foundry | 54.00 to 55.00 |
| No. 2 X foundry | 53.00 to 55.00 |
| No. 2 plain | 52.00 to 54.00 |
| No. 2 foundry | 51.00 to 53.00 |
| Gray forge | 51.00 to 53.00 |
| Malleable | 54.00 to 55.00 |
| Basic | 54.00 to 55.00 |
| Lake Superior charcoal, f.o.b. Buffalo | 55.00 to 60.00 |

**Old Material.**—Only a small total of business was transacted during the week and a lack of demand has caused prices of some grades to sag. Consumers are still waiting for Governmental action, and holding off purchases until it is determined how price regulation of steel will actually affect scrap materials. Some dealers express the belief that after a buying movement develops, prices cannot be controlled, as owing to the pronounced scarcity it will be a case of consumers competing against each other and the law of supply and demand will control the situation. Great difficulty is being experienced in forwarding shipments on contracts owing to the many embargoes in force. A hampering feature militating against prompt shipment is the new regulation requiring special permit from the railroads for consignments to all embargoed points. The price for low phosphorus has dropped to $41 and $42 per ton, and prices for heavy melting steel, iron axles, steel axles, railroad malleable and wrought pipe have been lowered $1 to $2 per ton. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

| | |
|---|---|
| Heavy melting steel | $31.50 to $32.00 |
| Low phosphorus | 41.00 to 42.00 |
| No. 1 railroad wrought | 43.00 to 44.00 |
| No. 1 railroad and machinery cast | 30.00 to 31.00 |
| Iron axles | 45.00 to 47.00 |
| Steel axles | 45.00 to 47.00 |
| Carwheels | 35.00 to 36.00 |
| Railroad malleable | 32.00 to 33.00 |
| Machine shop turnings | 18.00 to 19.00 |
| Heavy axle turnings | 26.00 to 27.00 |
| Clean cast borings | 20.00 to 21.00 |
| Iron rails | 43.00 to 44.00 |
| Locomotive grate bars | 20.00 to 21.00 |
| Stove plate | 21.00 to 22.00 |
| Wrought pipe | 28.00 to 29.00 |
| No. 1 busheling scrap | 28.00 to 29.00 |
| No. 2 busheling scrap | 18.00 to 19.00 |
| Bundled sheet stamping scrap | 20.00 to 21.00 |

**Finished Iron and Steel.**—Inquiry from the general commercial trade is still largely in abeyance in expectancy of price readjustment, with Government requirement business receiving priority attention in all lines, but conditions seem to be shaping for a buying movement by the general trade within a month or two and there appears to be a growing feeling that prices to be established by the Government are to be on a somewhat better level than has been expected. It is also becoming apparent that mill operating departments are going to be restricted in the output of steel through inability to obtain adequate supplies of coke promptly, and because of labor shortage. It is reported that one of the leading steel producing interests estimates that this condition will lead to a curtailment of approximately 20 per cent of its total output during the first half of 1918. This impending lessening of output, together with the Governmental requirements, now estimated at approximately 25 per cent of product for the first half of the year, will leave a relatively small proportion of the normal total of steel production to meet general commercial requirements. With this in mind, buyers are likely to abandon their hesitancy and go ahead and do business. Canadian car companies are making inquiry for round tonnages of bars, plates and shapes approximating 60,000 tons, the material to be used in connection with contracts placed by the Dominion Government for cars to be used on Canadian railroads. The Ferguson Steel &

Iron Co., Buffalo, has the contract for the steel for additional buildings for the Sizer Forge Co., Buffalo, a heat treatment building and an office building, taking 150 tons.

## New York

NEW YORK, Sept. 12.

**Pig-Iron.**—The effect of continued offering of iron for resale is being more clearly shown and several hundred tons of Pennsylvania No. 2X have been sold in New England territory as low as $47, furnace, but after sales at this very low figure were made other sales followed around $50, furnace. The resale iron comes largely from foundries which have bought liberally and feel that they are well able to dispose of some of the iron which they have on hand. Traveling men who have been in New England recently report that many foundries are well supplied not only with pig-iron but also with coke and are showing no disposition to buy at the present time. Owing to the uncertainty as to obtaining licenses to ship foreign iron, very little attention is being paid to that branch of the business. On the whole, the pig-iron market may be said to be weak with a tendency toward lower quotations. We quote for tidewater delivery in the near future as follows:

| | |
|---|---|
| No. 1 foundry | $49.25 to $51.25 |
| No. 2 X | 48.75 to 50.75 |
| No. 2 plain | 48.25 to 50.25 |
| Southern No. 1 foundry | 50.75 to 51.75 |
| Southern No. 2 foundry and soft | 50.25 to 51.25 |

**Structural Material.**—Although prices for several weeks' shipment are on a lower level, as noted last week, fabricators do not find that deliveries are any better, price readjustment having thus occurred before irregularities in mill shipments have been reduced. Meanwhile new propositions continue to be for government work. As an example, tentative inquiries have been made for 100 structures, 50 x 200 ft., in plan, probably requiring all told 10,000 tons of steel, but plans are clearly as yet indefinite and it is not known whether this includes any of the considerable structural material which will undoubtedly be required for government railroads in France. The $5,000,000 which is to be spent for buildings for the enlarged program of making field guns will undoubtedly shortly take definite form in proposals. Some 5600 tons of structural material, not including bars, are covered in an inquiry for eight ships for Italy. The awards of the week include 600 tons for the Willys-Morrow plant, Elmira, N. Y.; 500 tons for a piershed in Brooklyn for W. R. Grace & Co., the steel to be supplied by the Bethlehem Steel Co.; 200 tons for the United States Cast Iron Pipe & Foundry Co., Burlington, N. J., and a 90-ton bridge for the Boston & Albany. This to be erected by the Boston Bridge Works. We quote mill shipments at 4.445c. to 5.195c., New York, while from warehouses shipments are made at 5c. to 5.50c per lb., New York.

**Steel Plates.**—The American International Steel Corporation is asking prices for eight ships for Italy, involving all told 14,400 tons of hull plates, 800 tons of boiler steel and 800 tons of bars, in addition to 5600 tons of structural shapes. No business of volume has been done, but plates in the fourth quarter can be obtained at 8c., Pittsburgh, by regular domestic buyers of the mills so quoting. There are still mills asking 10c. for tank quality and 8.50c. has been quoted to a jobber. We quote plates at 8.195c. and higher and out of store at 8c. and higher.

**Iron and Steel Bars.**—Steel bars are quoted at 4c. to 4.50c., Pittsburgh basis, depending on the mill, and a sale of 500 tons for the last quarter is quoted at the top price. Export buying in iron bars has tapered off considerably, but last quarter contracting is under active negotiations with 4.75c., Pittsburgh, as the usual figure. We quote steel bars in say two months' delivery at 4.195c. to 4.695c., New York, and iron bars at 4.945c. From New York district warehouses steel and iron bars are sold at 5c. to 5.50c.

**Other Forms of Steel.**—Some transactions showing strength in prices are noted on export business. One lot of 5000 kegs of wire nails and another of 6000 kegs for six to eight weeks' delivery have been sold at $5.30, Pittsburgh; 200 tons of galvanized barb wire has been closed at $5.50 per 100 lb.; 200 tons of wire rods were closed at $90 per gross ton.

**Cast Iron Pipe.**—The Warren Foundry & Machine Co. is furnishing about 500 tons of pipe for the new Government camp at Tenafly, N. J., where about 20,000 soldiers will be stationed from time to time before embarking for France. New business, both private and public, is extremely limited. Carloads of 6-in., 8-in. and heavier are quoted at $65.50 per net ton, tidewater, and 4-in. at $68.50.

**Old Material.**—The market continues extremely dull and there is a decided softening tendency, but prices show very little change, probably because there is not enough business to test them. The car situation continues to be very unsatisfactory and dealers say that a considerable part of their time is required in getting permits. Brokers quote buying prices as follows to New York producers and dealers per gross ton, New York:

| | |
|---|---|
| Heavy melting steel scrap (for shipment to eastern Pennsylvania) | $27.50 to $28.00 |
| Old steel rails (short lengths) or equivalent heavy steel scrap | 27.00 to 28.00 |
| Relaying rails | 63.00 to 65.00 |
| Rerolling rails | 37.00 to 38.00 |
| Iron and steel car axles | 40.00 to 42.00 |
| No. 1 railroad wrought | 39.00 to 40.00 |
| Wrought-iron track scrap | 30.00 to 31.00 |
| No. 1 yard wrought long | 30.00 to 31.00 |
| Light iron | 8.00 to 10.00 |
| Cast borings (clean) | 19.00 to 20.00 |
| Machine-shop turnings | 16.00 to 17.00 |
| Mixed borings and turnings | 14.00 to 16.00 |
| Wrought-iron pipe (1 in. minimum diameter, not under 2 ft. long) | 28.00 to 30.00 |

For cast-iron scrap, dealers in New York City and Brooklyn are quoting as follows to local foundries per gross ton:

| | |
|---|---|
| No. 1 machinery cast | $30.00 to $31.00 |
| No. 1 heavy cast (column, building material, etc.) | 26.00 to 27.00 |
| No. 2 cast (radiators, cast boilers, etc.) | 26.00 to 28.00 |
| Stove plate | 18.00 to 19.00 |
| Locomotive grate bars | 18.00 to 19.00 |
| Old carwheels | 31.00 to 33.00 |
| Malleable cast (railroad) | 30.00 to 31.00 |

**Ferroalloys.**—There has been a fair inquiry for domestic ferromanganese in the past week, particularly for future delivery as far as into the second quarter of next year, but very few sales are reported. Quotations continue firm at $400 to $425 for prompt and $400 for delivery the rest of this year, with $375 asked for delivery in the first half of 1918. There is practically no British alloy available for any delivery. Official returns show imports to have been only 2037 tons in July, the smallest this year. Inquiries indicate that receipts in August were better than in July, with those so far in September at about the same rate as in August. Domestic production continues to increase, the blast furnace reports of THE IRON AGE showing the output in August to have been about 500 tons greater than that of July, which itself was a record. The August output was 24,482 tons of 80 per cent alloy with the spiegeleisen production at 16,791 tons, or about 300 tons under that for July. There is an inquiry for 4000 tons of spiegeleisen for a Middle Western consumer, but otherwise the market is dull and few sales are reported. The quotation has eased off to $80 to $82.50, furnace, for the 20 per cent grade. Ferrosilicon, 50 per cent, is in quiet demand with the quotation for early delivery at $200 to $225. For delivery next year the range is $140 to $175, delivered.

The American Association of Engineers, 602 West La Salle Street, Chicago, has organized chapters in St. Paul, Indianapolis and Milwaukee, making a total of seven since the association was incorporated there two years ago. A joint meeting of the association and the Detroit Engineering Society was held Aug. 30 and plans are on foot to develop a working co-operation between the associations. The total enrollment of the American Association of Engineers is given now as over 2200.

# IRON AND INDUSTRIAL STOCKS

## Wall Street Has Another Bad Week, Attributed to Heavy War Demands

The setback given to La Follette and his little band of radicals was not sufficient to relieve the mental depression from which Wall Street has been suffering for a number of weeks and slumps were noted in nearly all the leading industrial stocks. This condition is attributed to a continuation of the re-adjustment of business to meet the heavy demand upon this nation resulting from the European war. The deplorable state of affairs in Russia, which promises to result in the indefinite continuation of the European struggle, was one of the discouraging influences of the week. The money market advanced to 6 per cent for call money following the publication of the bank statement showing the smallest surplus reserves in a long time. Fear is entertained that war taxes will take for government use such a large percentage of earnings that present holders will be compelled to sell large amounts of their present taxable securities.

Among the stocks that registered gains during the week were the following: American Car & Foundry, 2¾; American Locomotive, ¼; American Steel Foundries, 5¾; Baldwin Locomotive, 1¾; Colorado Fuel & Iron, ½; Crucible Steel, 1½; Lackawanna Steel, 1¾; National Enameling & Stamping, ¼; Pressed Steel Car, 2; Republic Iron & Steel, 1¼. Among the stocks that made losses during the week were the following: Allis-Chalmers, ⅛; American Can, 2; Bethlehem Steel, 7; Bethlehem Steel, Class B, 4; Gulf States Steel, 2; International Harvester, 3¼; Midvale Steel, 1; United States Steel, 1¾; United States Steel, Preferred, ¼.

The range of prices on active iron and steel stocks from Wednesday of last week to Tuesday of this week was as follows:

| | | | |
|---|---|---|---|
| Allis-Chal., com.. | 23 - 24¾ | Int. Har. of N. J., com. | 108 -112 |
| Allis-Chal., pref.. | 81½ - 82¾ | Int. Har. of N. J., pref. | 112½ |
| Am. Can, com... | 38¼ - 42¼ | Int. Har. Corp., com. | 76 |
| Am. Can, pref... | 107½ - 108⅝ | Lacka. Steel.... | 78 - 83¼ |
| Am. Car & Fdry., com. | 66½ - 73 | Lake Sup. Corp.. | 15¾ - 17½ |
| Am. Car & Fdry., pref. | 112½ - 113¹ | Midvale Steel.... | 51½ - 53¾ |
| Am. Loco., com.. | 58⅛ - 62¾ | Nat.-Acm | 32½ |
| Am. Loco., pref.. | 102 -103 | Nat. En. & Stm., com. | 37½ - 38¾ |
| Am. Rad., com.. | 296 -300 | N. Y. Air Brake.. | 117¾ - 121 |
| Am. Rad., pref. | 133 | Nova Scotia Steel | 94½ - 96 |
| Am. Ship, com.. | 89 - 90½ | Pressed Stl., com. | 58 - 62⅝ |
| Am. Ship, pref. | 92 | Ry. Steel Spring. com. | 44 - 47½ |
| Am. Steel Fdries. | 62 - 69½ | Republic, com.... | 77¾ - 82 |
| Bald. Loco., com. | 55 - 60½ | Republic, pref. .. | 101⅛ - 102¼ |
| Bald. Loco., pref. | 99 - 99½ | Sloss, com. ..... | 43 - 46⅞ |
| Beth. Steel, com. | 102½ - 109 | Sloss, pref. ..... | 90 |
| Beth. Steel, class B ..... | 101¼ - 108¼ | Sup. Steel ..... | 37 |
| Beth. Steel, pref. | 100 -103 | Sup. Steel, 1st pref. ..... | 102½ |
| Cambria Steel ..... | 155 | Transue-Williams .... | 40 |
| Central Fdry., com. ..... | 27½ - 29¾ | Un. Alloy Steel.. | 42½ - 43⅜ |
| Chic. Pneu. Tool | 59 - 65¼ | U. S. Pipe, com.. | 16 - 17 |
| Colo. Fuel ..... | 43 - 45¾ | U. S. Steel, com. ..... | 104⅝ - 109¼ |
| Cruc. Steel, com. | 68 - 70⅝ | U. S. Steel, pref. ..... | 116½ - 116⅞ |
| Cruc. Steel, pref. | 95⅞ - 98 | Va. I. C. & Coke. | 55 - 60 |
| Gen. Electric.... | 137 -147½ | Warwick ..... | 9 |
| Gt. No. Ore. Cert. | 32¼ - 34⅞ | Westing. Elec.... | 43⅝ - 45¾ |
| Gulf States Steel | 98 -101½ | | |
| Gulf States Steel. 1st pref. .... | .107 -108 | | |

## Industrial Finances

The Westinghouse Electric & Mfg. Co. will pay out of treasury funds, Oct. 1, $2,720,000, 5 per cent collateral notes maturing on that date. The Westinghouse company, in the current fiscal year, which began April 1, will have the biggest period in its history. Unfilled orders on hand Aug. 1, for regular line work exclusive of war business, amounted to over $51,000,000, which is in itself larger than total sales billed in the entire fiscal period ended March 31, 1916, the latter figures being $50,269,240. Government work, if included, would raise the total of unfilled orders much higher than that given above.

The Breitung Iron Co., recently formed to take over the Breitung iron ore properties in the upper peninsula of Michigan, has secured permission from the Securities Commission of Michigan to sell $1,500,000 in notes, the money to be applied to the development of some of its properties, provided certain changes are made in its leases, royalties, etc. Important mines owned by the company include the Breitung Hermatite, the Mary Charlotte and the Juliet, all in the Marquette range.

## Nova Scotia Earnings

The Nova Scotia Steel & Coal Co., Ltd., for the six months ended June 30, 1917, earned after interest on bonds and debenture stock, $1,596,469. This compares with net of $2,104,478 for the entire 1916 year, and is a little in excess of the $1,576,743 earned in the full 1915 year.

After deducting the 4% dividend for the six months on the $1,000,000 preferred, there is left a balance applicable to the common stock of $20.75 per share. This is an annual rate of $41.50. This is counting the common stock issue as $7,500,000, which will be increased to $15,000,000 when pending financing is completed and the proposed 20% stock dividend is paid. On the enlarged capital, therefore, Nova Scotia earned in the six months at the annual rate of $20.75 a share.

This compares with three previous years as follows:

| | Net After Charges | Preferred Dividend | Balance for Common | Per Cent on Common |
|---|---|---|---|---|
| 6 months, 1917... | $1,596,469 | $40,000 | $1,556,469 | †20.75 |
| 1916 ..... | 2,104,478 | 80,000 | 2,024,478 | 27.0 |
| 1915 ..... | 1,576,743 | 123,600 | 1,453,143 | 19.3 |
| 1914 ..... | *308,986 | 41,200 | ..... | .... |

*Deficit. †On $7,500,000.

The Acme Wire Co., New Haven, Conn., has passed its usual quarterly dividend of two per cent, although its net earnings for the quarter were about double the dividend requirements. The officials have announced that the large increase in the cost of materials and the present transportation difficulties require the conservation of the company's cash. The gross business of the company for the first six months of 1917 was $1,600,000, as against a total of $2,000,000 for the year 1916.

## Dividends

The Allis-Chalmers Mfg. Co., quarterly, 1¾ per cent on the common and ¾ per cent on account of accumulated dividends on the preferred, both payable Oct. 15.

The American Can Co., quarterly, 1¾ per cent and extra 3½ per cent on account of accumulated dividends on the preferred, both payable Oct. 1.

The American Car & Foundry Co., quarterly, 1 per cent and extra 1 per cent on the common and quarterly, 1¾ per cent on the preferred, all payable Oct. 1.

The American Steel Foundries, quarterly, 1¾ per cent, payable Sept. 29.

The Canadian General Electric Co., Ltd., quarterly, 2 per cent on the common and 3½ per cent on the preferred, payable Oct. 1.

The Central Foundry Co., quarterly, 2 per cent on the first preferred, payable Oct. 15.

The Gulf States Steel Co., quarterly, 2 per cent and extra ½ per cent on the common and quarterly, 1¾ per cent on the first and 1½ per cent on the second preferred, all payable Oct. 1.

The Sloss-Sheffield Steel & Iron Co., quarterly, 1¾ per cent on the preferred, payable Oct. 1.

The Trussed Concrete Steel Co., quarterly, 4 per cent on the common, payable Oct. 15.

The Brier Hill Steel Co., quarterly, 1½ per cent and extra 3½ per cent on the common, and quarterly 1¾ per cent on the preferred, all payable Oct. 1.

The plant of the Carbon Iron & Steel Co., Parryville, Pa., sold at sheriff's sale on a mortgage of $350,000 held by the Central Railroad of New Jersey, was bought by Albert Broden, representing that company, for $200,000. The plant, which employs about 100 men, will be enlarged and the business continued. Mr. Broden was for some time connected with the Philadelphia and Reading Coal & Iron Co.

The statement of the Thomas Iron Co., Allentown, Pa., for the current year shows total sales of $2,837,433; gross profits, $85,071, which with receipts from other sources made a gross income of $289,770. Interest, discount and dividend disbursements amounted to $104,898, leaving a surplus for the year of $184,873.

# REVENUE BILL PASSED

## Conference Committee Expected to Report in About Ten Days

WASHINGTON, Sept. 11.—The war revenue bill, carrying a total of $2,400,000,000, was passed by the Senate last night by a vote of 69 to 4. The bill raises approximately $533,000,000 more than the measure as passed by the House and together with existing revenue laws will produce annually about $3,700,000,000. On this basis, it is estimated that the United States will defray about 35 per cent of the cost of the war by taxation and 65 per cent by bond issues.

Of the total amount of new taxes provided by the bill, $842,200,000 will be taken from corporate and individual incomes and $1,060,000,000 from war profits. The remainder will be derived largely from taxes on liquor, tobacco and public utilities. In the closing hours of the debate on the bill, the consumption taxes on sugar, coffee, tea and cocoa, inserted by the Finance Committee, were stricken out by overwhelming majorities. The Senate also eliminated the proposed tax on publishers, the increase in postage on second class mail and the tax of one cent on each letter or post card. A tax on parcel post packages, the postage charge on which amounts to 25 cents or more, was retained.

Individual income taxes were increased by the Senate over the House rates, the principal change being the addition of three new "brackets" imposing taxes of 40 per cent on incomes exceeding $500,000 and not exceeding $750,000; 45 per cent on incomes exceeding $750,000 and not exceeding $1,000,000, and 50 per cent upon incomes exceeding $1,000,000. The normal rate of 4 per cent on individual incomes as adopted by the House was accepted by the Senate. The normal rate on corporate incomes, however, was increased to 6 per cent and the corporate income tax law was amended so as to levy an additional tax of 10 per cent upon the undistributed surplus of each taxable year, with a proviso that this tax shall not apply "to that portion of such undistributed net income which is actually invested and employed in the business or is retained for employment in the reasonable requirements of the business."

Sweeping changes in the war profits tax as adopted by the House were made by the Senate. In the bill as framed by the Ways and Means Committee, a tax of 16 per cent was levied upon all profits in excess of 8 per cent plus $5,000. The Finance Committee struck out the House provision and adopted a modified form of the English system for determining war profits, taking as a basis of the tax the difference between the average earnings of the pre-war period (i.e. the calendar years 1911, 1912 and 1913) and those of the taxable year with a proviso that in no case shall the pre-war earnings be calculated at more than 10 per cent nor less than 6 per cent of the capital invested. On this basis, the bill imposes the following scale of taxes: 12 per cent of war profits not in excess of 15 per cent; 16 per cent of profits exceeding 15 but not exceeding 25 per cent; 20 per cent of profits exceeding 25 but not exceeding 50 per cent; 25 per cent of profits exceeding 50 but not exceeding 75 per cent; 30 per cent of profits exceeding 75 but not exceeding 100 per cent; 35 per cent of profits exceeding 100 but not exceeding 150 per cent; 40 per cent of profits exceeding 150 but not exceeding 200 per cent; 45 per cent of profits exceeding 200 but not exceeding 250 per cent; 50 per cent of profits exceeding 250 but not exceeding 300 per cent; and 60 per cent of profits exceeding 300 per cent.

The bill as passed by the Senate was to-day received by the House and immediately referred to a conference committee composed of Senators Simmons, Stone and Williams, Democrats, Penrose and Lodge, Republicans, and Representatives Kitchin, Rainey and Dixon, Democrats, and Fordney and Moore, Republicans. Owing to the important increases made in the bill by the Finance Committee, it is believed the House will accept the bulk of the Senate changes and that the measure will be disposed of by the conference committee in about 10 days.

## Lake Iron-Ore Shipments in August

Iron ore shipments from the Lake Superior region in August exceeds the record for the same month last year by 3.01 per cent, or 296,646 tons. The total was 10,146,786 gross tons, against 9,850,140 tons in August, 1916. The totals by ports, with season shipments and a comparison with 1916 are given below:

| | August, 1917 | August, 1916 | To Sept. 1, 1917 | To Sept. 1, 1916 |
|---|---|---|---|---|
| Escanaba ..... | 951,620 | 1,061,285 | 4,089,191 | 4,708,477 |
| Marquette ..... | 629,426 | 634,786 | 1,899,062 | 2,469,705 |
| Ashland ..... | 1,278 118 | 1,289,439 | 4,425,912 | 4,796,384 |
| Superior ..... | 2,444,632 | 1,950,249 | 8,202,216 | 7,815,795 |
| Duluth ..... | 3 326,254 | 3,380,066 | 11,999,021 | 12,718,548 |
| Two Harbors ... | 1,516,736 | 1,534,315 | 5,908,152 | 6,706,955 |
| Total ..... | 10,146,786 | 9,850,140 | 36,523,554 | 39,215,864 |
| 1917 increase.... | 296,646 | ..... | ..... | ..... |
| 1917 decrease.... | ..... | ..... | 2,692,310 | ..... |

There has been a decrease in the season's shipments to Sept. 1 of 2,692,310 tons, or 6.86 per cent. The Duluth percentage of this total is 32.85 per cent, as compared with 32.43 per cent last year, while that for the Great Northern also reveals an increase of this year's percentage of the total having been 18.58 per cent as against 17.43 per cent last year.

## High Pay for Rollers

PITTSBURGH, Sept. 12—(*By Wire*).—Under the bimonthly settlement of sheet and tin plate wage scales in mills that sign the Amalgamated Association scale made at a conference held in Youngstown on Tuesday, Sept. 11, scale rollers on hot mills in sheet and tin plate plants will receive considerably over $25 per day for themselves, the remainder of the crew being paid by the company. Formerly the hot mill roller paid his own crew, but this was changed some years ago, and now the company pays the crew, the hot mill roller keeping his entire earnings for himself.

## One of the Heaviest Armor Plates

What is claimed as one of the heaviest armor plates ever rolled is reported by the London *Ironmonger* to have been manufactured by Sir John Brown & Co., at their Atlas Work , Sheffield, England. The size of the slab of steel when in the furnace was about 20 ft. long by about 4 ft. broad and 21 in. thick. Its rough weight was over 21 tons. Before being rolled it was built up in the furnace by five mold plates, each 3 in. thick, and one solid plate of 6 in. At a proper heat this mass was withdrawn and in a quarter of an hour was reduced to a compact slab of iron of a uniform thickness of 15 in. The men at work were attired in thin steel leggings, aprons of steel and with a thin curtain of steel wirework dropping over their faces. All the rest of their bodies were muffled in thick, wet sacking.

## Maximum Coke Prices in Italy

Maximum prices for coke in Italy have been fixed by a decree of the Minister of Industry, Commerce and Labor as follows: From Aug. 1 to Sept. 30, 1917, the maximum selling price of gas coke for immediate delivery C. O. D. at factory is as follows: Coke, large, 280 lire ($54.04) per ton; powdered, with mesh, 293.50 lire ($56.65); nut coke, 152 lire ($29.34); coke, bulk cargoes without mesh, 255 lire ($49.21). The communes are to fix a moderate superprice for the sale and delivery of these goods ex-factory in their territory, in accordance with a decree of Oct. 26, 1916.

Persons selling gas coke at prices higher than those established, plus any communal superprice that may be fixed, will be fined 200 or 300 per cent of the entire price received from such illegal sales in accordance with a decree of Aug. 6, 1916. Repeated offense will render the offender liable to one year's imprisonment in addition. In case a dealer, producer, or any other seller refuses to sell gas coke at the established maximum prices, plus the communal superprice, the prefect or, if necessary, the syndic may sequester the goods and cause them to be sold at the expense of the holder, for whom, however, the amount necessary for his own consumption will be served.

# Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c.; Denver pipe, 76.1c.; minimum carload, 46,000 lb.; structural steel and steel bars, 76.1c., minimum carload, 40,000 lb.; Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 60,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

### Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 4.00c.

### Wire Products

(Prices of independent mills)

Wire nails, $4 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $4.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.95; galvanized wire, $4.65; galvanized barb wire and fence staples, $4.85; painted barb wire, $4.15; polished fence staples, $4.15; cement-coated nails, $3.90 base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 43 per cent off list for carload lots, 42 per cent off for 1000-rod lots, and 41 per cent off for small lots, f.o.b. Pittsburgh.

### Nuts and Bolts

Discounts in effect for large buyers are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days.

Carriage bolts, small, rolled thread, 40 per cent, small cut thread, 35 and 2½ per cent; large, 25 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 40 and 10 per cent; small, cut thread, 40 per cent; large, 30 per cent.

Machine bolts, c. p. c. and t. nuts, small, 30 per cent; large, 20 per cent. Bolt ends, h. p. nuts, 30 per cent with c. p. nuts, 20 per cent. Lag screws (cone or gimlet point), 45 per cent.

Nuts, h. p. sq. blank, $2.10 off list, and tapped, $1.90 off; hex., blank, $1.90 off, and tapped, $1.70 off; nuts, c. p. c. and t. sq. blank $1.70 off, and tapped, $1.50 off; hex. blank, $1.60 off, and tapped, $1.40 off. Semi-finished hex. nuts, 50 and 10 per cent. Finished and case-hardened nuts, 50 and 10 per cent.

Rivets 7/16 in. in diameter and smaller, 40 per cent.

### Wire Rods

Soft Bessemer and open-hearth rods to domestic consumers at $90 to $95; high-carbon rods made from ordinary open-hearth steel $95 to $100, and special steel rods with carbons running from 0.40 to 0.60, $100 to $110 at mill; above 0.60 carbon, $115 to $120.

### Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. and larger, $7.00; ⅝ in., 7/16 in. and ½ in., $7.00 base. Boat spikes are occasionally quoted $7.00 to $8.00, all per 100 lb., f.o.b. Pittsburgh, but some makers are quoting higher. Track bolts with square nuts, 7c. to 7.50c. to railroads, and 8c. to 8.50c., in small lots, for fairly prompt shipment.

### Steel Rails

Angle bars at 3.50c. to 3.75c. at mill, when sold in connection with orders for standard section rails, and on carload and smaller lots, 4c. to 4.25c. at mill. Light rails, 25 to 45 lb., $75 to $80; 16 to 20 lb. $80 to $81; 12 and 14 lb., $82 to $83; 8 and 10 lb., $83 to $84; in carload lots, f.o.b. mill, with usual extras for less than carloads. Standard Bessemer rails, $38; open-hearth, $40, per gross ton, Pittsburgh.

### Tin Plate

Effective July 31, prices on all sizes of terne plate were advanced from $2 to $2.50 per package and are now as follows: 8-lb. coating, 200 lb., $16 per package; 8-lb. coating, I. C., $16.30; 12-lb. coating, I. C., $17.50; 15-lb. coating, I. C., $18.25; 20-lb. coating, I. C., $19; 25-lb. coating, I. C., $20; 30-lb. coating, I. C., $21; 35-lb. coating, I. C., $22; 40-lb. coating, I. C., $23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

### Iron and Steel Bars

Steel bars at 4c. to 4.50c. for delivery late this year, and 4.50c. to 5c. from warehouse, in small lots for prompt shipment. Refined iron bars, 4.75c.; railroad test bars, 5.25c. in carload and larger lots f.o.b. mill.

### Wrought Pipe

The following discounts on steel are to jobbers for carload lots on the Pittsburgh basing card in effect from May 1, 1917, all full weight, except for LaBelle Iron Works and Wheeling Steel & Iron Co., which quote higher prices, and National Tube Co., which adheres to card of April 1.

| Steel | | | Iron | | |
|---|---|---|---|---|---|
| | | *Butt Weld* | | | |
| Inches | Black | Galv. | Inches | Black | Galv. |
| ⅛, ¼ and ⅜ | 42 | 15½ | ⅛ and ¼ | 23 | +4 |
| ½ | 46 | 31½ | ⅜ | 24 | +2 |
| ¾ to 3 | 49 | 35½ | ½ | 28 | 10 |
| | | | ¾ to 1½ | 33 | 17 |
| | | *Lap Weld* | | | |
| 2 | 42 | 29½ | 2 | 26 | 12 |
| 2½ to 6 | 45 | 32½ | 2½ to 6 | 28 | 15 |
| 7 to 12 | 42 | 28½ | 7 to 12 | 25 | 12 |
| 13 and 14 | 32½ | .. | | | |
| 15 | 30 | .. | | | |
| | | *Butt Weld, extra strong, plain ends* | | | |
| ⅛, ¼ and ⅜ | 38 | 20½ | ⅛, ¼ and ⅜ | 22 | 5 |
| ½ | 43 | 30½ | ½ | 27 | 14 |
| ¾ to 1½ | 47 | 34½ | ¾ to 1½ | 33 | 18 |
| 2 to 3 | 48 | 35½ | | | |
| | | *Lap Weld, extra strong, plain ends* | | | |
| 2 | 40 | 28½ | 2 | 27 | 14 |
| 2½ to 4 | 43 | 31½ | 2½ to 4 | 29 | 17 |
| 4 to 6 | 42 | 30½ | 4½ to 6 | 28 | 16 |
| 7 to 8 | 38 | 24½ | 7 to 8 | 20 | 8 |
| 9 to 12 | 33 | 19½ | 9 to 12 | 15 | 3 |

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

### Boiler Tubes

Nominal discounts on less than carload lots, freight added to point of delivery, effective from Nov. 1, 1916, on standard charcoal iron tubes and from April 2, 1917, on lap-welded steel tubes are as follows:

| *Lap-Welded Steel* | | *Standard Charcoal Iron* | |
|---|---|---|---|
| 1¾ and 2 in. | 31 | 1½ in. | 23 |
| 2¼ in. | 28 | 1¾ and 2 in. | 35 |
| 2½ and 2¾ in. | 34 | 2¼ in. | 32 |
| 3 and 3¼ in. | 34 | 2½ and 2¾ in. | 38 |
| 3½ to 4½ in. | 34 | 3 and 3¼ in. | 43 |
| 5 and 6 in. | 33 | 3½ to 4½ in. | No quotations |
| 7 to 13 in. | 30 | 5 and 6 in. | 37 |
| | | 7 to 13 in. | 34 |

Above discounts apply to standard gages and to even gages not more than four gages heavier than standard in standard lengths. Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

### Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days.

[Open-hearth stock, $5 per ton above these prices.]

*Blue Annealed—Bessemer*

| | Cents per lb. |
|---|---|
| Nos. 3 to 8 | 8.00 to 8.50 |
| Nos. 9 and 10 | 8.25 to 8.50 |
| Nos. 11 and 12 | 8.50 to 8.75 |
| Nos. 13 and 14 | 8.75 to 9.00 |
| Nos. 15 and 16 | 9.00 to 9.25 |

*Box Annealed, One Pass Cold Rolled—Bessemer*

| | |
|---|---|
| Nos. 17 to 21 | 8.30 to 8.80 |
| Nos. 22 and 24 | 8.35 to 8.85 |
| Nos. 25 and 26 | 8.40 to 8.90 |
| No. 27 | 8.45 to 8.95 |
| No. 28 | 8.50 to 9.00 |
| No. 29 | 8.55 to 9.05 |
| No. 30 | 8.65 to 9.15 |

*Galvanized Black Sheet Gage—Bessemer*

| | |
|---|---|
| Nos. 10 and 11 | 9.00 to 9.50 |
| Nos. 12 and 14 | 9.10 to 9.60 |
| Nos. 15 and 16 | 9.25 to 9.75 |
| Nos. 17 to 21 | 9.40 to 9.90 |
| Nos. 22 and 24 | 9.55 to 10.05 |
| Nos. 25 and 26 | 9.70 to 10.20 |
| No. 27 | 9.85 to 10.35 |
| No. 28 | 10.00 to 10.50 |
| No. 29 | 10.25 to 10.75 |
| No. 30 | 10.50 to 11.00 |

*Tin-Mill Black Plate—Bessemer*

| | |
|---|---|
| Nos. 15 and 16 | 7.80 to 8.30 |
| Nos. 17 to 21 | 7.85 to 8.35 |
| Nos. 22 to 24 | 7.90 to 8.40 |
| Nos. 25 to 27 | 7.95 to 8.45 |
| No. 28 | 8.00 to 8.50 |
| No. 29 | 8.05 to 8.55 |
| No. 30 | 8.05 to 8.55 |
| Nos. 30½ and 31 | 8.10 to 8.60 |

# Metal Markets

## The Week's Prices

Cents Per Pound for Early Delivery

| | Copper, New York | | Tin, | Lead | | Spelter | |
|---|---|---|---|---|---|---|---|
| | | Electro- | New | New | St. | New | St. |
| Sept. | Lake | lytic | York | York | Louis | York | Louis |
| 5 | 25.25 | 25.25 | 60.75 | 10.00 | 10.00 | 8.25 | 8.00 |
| 6 | 25.25 | 25.25 | 60.75 | 9.87½ | 9.75 | 8.25 | 8.00 |
| 7 | 25.25 | 25.25 | 60.75 | 9.87½ | 9.75 | 8.12½ | 7.87½ |
| 8 | 25.25 | 25.25 | .... | 9.75 | 9.50 | 8.12½ | 7.87½ |
| 10 | 25.50 | 25.50 | 61.00 | 9.70 | 9.50 | 8.25 | 8.00 |
| 11 | 25.50 | 25.50 | 61.37½ | 9.70 | 9.50 | 8.25 | 8.00 |

NEW YORK, Sept. 12.

The entire market has a better tone but actual buying is not yet a market influence in any case. Copper is firmer and nominally higher. Tin is steady and stronger. Lead is dull and lower. Spelter is more active and steady. Antimony is still lifeless.

### New York

**Copper.**—It is a fact that nearly 77,000,000 lb. of copper has been bought for the Allies at a price understood to be 25c. per lb. Deliveries on this sale are reported to extend from now to the end of the year. Active negotiations as to the price and the amount needed by the Government itself are being continued from yesterday into to-day at Washington and the trade is anxiously awaiting a decision. It is suspected that there is some controversy as to whether the price should not be lower than that arranged for the Allies. As a result of the Allied purchase and the other negotiations the market has a better tone and more inquiry is reported. There has been, however, no increased buying despite various reports to that effect and quotations continued nominal at 25.50c., yesterday, for both Lake and electrolytic. Buyers continue to hold back but it is expected that a more active market will develop in the near future. The London market continues unchanged at £137 for spot electrolytic and £133 for futures.

**Tin.**—After a week of more or less stagnation and with more sellers than buyers, the market yesterday was characterized by better demand and by moderate sales, aggregating 125 to 150 tons. The present better tone appeared on Monday and it was aided by fair sales. The quotation stiffened on Monday from its low range of last week to 61c., New York, and yesterday to 61.37½c. Arrivals this month have been 700 tons with 5400 tons afloat. The London market has receded slightly from that reported last week, the quotation yesterday having been £243 per ton for spot Straits, a decline of 10s. for the week.

**Lead.**—The leading producer has again made a reduction in its quotation which is the second in the last two weeks. Its price is again $10 per ton lower and now stands at 10c. per lb., New York. The reduction was made last week Tuesday but it did not leak out until Wednesday. There is a lack of confidence permeating the entire lead market and this has resulted in a lower tone which has continued to attain momentum. There is very little new inquiry and sellers are undecided as to the best course to adopt. It is realized that pressure will continue to force the market down and therefore very little business was reported last week. Yesterday the result of the tendency downward was free offers of lead at 9.50c., St. Louis, and it is understood that this has resulted in a fair business being done. A fresh assortment of inquiries from Canada is reported to be before the market. For the last quarter some dealers are quoting as low as 9.12½c. to 9.25c., St. Louis, but practically no business is reported for that position.

**Spelter.**—There has been more inquiry the past week than in many weeks and sales have also been of larger volume than in a long time, but this does not mean much in quantity. While these have not yet affected quotations perceptibly, sentiment is decidedly better and the market is firmer. There has been sufficient metal to supply the demand at the current quotation of 8.12½c. to 8.25c., New York, or 7.87½c. to 8c., St. Louis, for early delivery. There have been sales at 7.75c., St. Louis, but of small volume. It is believed in the trade that the bottom of the market has been reached and that a turn for the better is near at hand, if not already here. The fairly large inquiry of the past two days, exceeding that of last week, is an indication. Apparent progress toward a settlement of the copper situation is a stimulating influence. Another factor is the enormous expenditures on Government account and its ultimate effect on business. A conservative estimate places the reduction in output in the country at 30 to 40 per cent, due to high cost and low returns. For future delivery quotations are about ⅛c. to ¼c. above those for early delivery.

**Antimony.**—Chinese and Japanese grades are available in a dull market at 14.50c. to 14.75c., New York, duty paid.

**Aluminum.**—The market is lifeless and unchanged at 47c. to 49c. per lb. for No. 1 virgin metal, 98 to 99 per cent pure.

**Old Metals.**—The market became a little more active the latter part of the week. Dealers' selling prices are as follows:

| | Cents per lb. |
|---|---|
| Copper, heavy and crucible | 26.50 to 27.00 |
| Copper, heavy and wire | 25.50 to 26.00 |
| Copper, light and bottoms | 22.50 to 23.50 |
| Brass, heavy | 18.50 to 19.00 |
| Brass, light | 13.00 to 14.00 |
| Heavy machine composition | 24.50 to 25.00 |
| No. 1 yellow rod brass turnings | 17.25 |
| No. 1 red brass or composition turnings | 19.00 to 21.00 |
| Lead, heavy | 9.00 |
| Lead, tea | 7.25 |
| Zinc | 6.25 |

### Chicago

CHICAGO, Sept. 10.—Two causes of a scarcity in copper are arousing much interest in that metal, one being heavy Government buying on behalf of the Allies of this country; the other being the cutting down of production by labor troubles practically wherever copper is refined. One producer has been idle for six weeks because of a strike, another has made but 40 per cent of what it should, and other like instances are cited. Higher prices are a natural sequence of these conditions. Lead is weak, spelter inactive and tin and antimony without special feature. We quote as follows: Casting copper, 27c.; Lake, 28.50c.; electrolytic, 28c.; tin, carloads, 61c.; small lots, 63c. to 64c.; lead, 9.50c. to 10c.; spelter, 8c.; sheet zinc, 19c.; antimony, 17c. to 18.50c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 22.50c.; copper clips, 21.50c.; copper bottoms, 21c.; red brass, 21c.; yellow brass, 15c.; lead pipe, 8c.; zinc, 5.50c.; pewter, No. 1, 35c.; tinfoil, 40c.; block tin, 45c.

### St. Louis

SEPT. 10.—The non-ferrous metals have been rather quiet during the past week and the quotations for car load lots of the Missouri product at the close to-day were: Lead, 9.75c.; Spelter, 8c. In less than car load lots the quotations were: Lead, 10.75c.; spelter, 9c.; tin, 66c.; lake copper, 30c.; electrolytic copper, 29.50c.; Asiatic antimony, 18c. In the Joplin district, while the range was $65 to $75 per ton for zinc blende, basis of 60 per cent metal, there was a weakening of $2.50 to $3.50 per ton in the second grade ores. The average for the district for the week was $69 per ton. Calamine ranged from $35 to $42 per ton with the average for 40 per cent ore for the week in the district at $39 per ton. Lead ore was down $10 per ton to $90 per ton, basis of 80 per cent metal, and the average for the week for the district was the same figure. On miscellaneous scrap metals, we quote dealers' buying prices as follows: Light brass, 11c.; heavy yellow brass, 14.50c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 22.50c.; pewter, 25c.; tinfoil, 42c.; tea lead, 5c.; zinc, 6c.; lead, 7c.

## Pittsburgh and Nearby Districts

In announcing the opening of the Evening School of Economics, Accounts and Finance in the University of Pittsburgh, Oct. 1, for the fall term, Dr. J. T. Holdsworth, dean, says that the program of courses is arranged not only to meet the need of trained men in all departments of business, but to provide practical training for women who must be prepared to fill the gaps in business due to the enlisting and drafting of men for the war. Business courses in the evening school open to women on the same basis as to men include accounting, auditing, cost systems and industrial management, business English and correspondence, advertising and selling, business psychology, public speaking, commercial Spanish, French, etc.

The Mellon interests of Pittsburgh and D. B. Zimmerman of Somerset, Pa., will open 15 coal mines in the Indian Creek Valley, Fayette County, Pa., where they control 20,000 to 30,000 acres of thin vein coal. Three openings have been started and others will be made as rapidly as they can be equipped. Ground has been broken for a town at Indian Head to house employees.

The Washington Tin Plate Co., Washington, Pa., has given notice that it will retire on Oct. 1, all its 5 per cent gold coupon bonds dated Oct. 1, 1907, by paying the holders thereof the principal and accrued interest.

Stockholders of the Petroleum Iron Works Co. and its associated companies, the Pennsylvania Tank Car Co., and the Pressed Steel Products Co., Petroleum, Pa., have unanimously re-elected all their officers. The presidents of the three companies in the order named are G. B. Bard, L. F. Jordon and John H. Consindine.

The Norwood Supply Co., Norwood, W. Va., has been incorporated with a capital of $50,000 to engage in the manufacture and sale of mill supplies.

The Pittsburgh Coal Co. of Pennsylvania has made application to list on the Pittsburgh Stock Exchange 321,692 shares of common and 360,000 shares of preferred stock, par value $100 a share.

## Nova Scotia's Steel and Pig Iron Output

Nova Scotia's iron and steel output in 1916 and 1915 are given as follows in net tons:

| | 1916 | 1915 |
|---|---|---|
| Pig iron | 429,615 | 295,868 |
| Steel ingots | 502,106 | 369,310 |
| Coke | 669,478 | 452,099 |

The increase for 1916 is marked. The imports of iron ore were 795,066 tons in 1916.

## Figuring on Gun Carriages

MILWAUKEE, Sept. 10.—Detailed specifications of work included in a proposed $25,000,000 contract for manufacturing gun carriages to be awarded by the Government have been received in Milwaukee and are being scheduled by William J. Fairbairn, secretary Milwaukee Metal Trades and Founders Association, and secretary of the metal trades committee, department of manufactures, Milwaukee County Council of Defense. The figuring is being done to determine whether all or any part of the work can be handled in Milwaukee. The carriages are designed to fit the 3-in. field pieces to be manufactured by the Wisconsin Gun Co., Milwaukee, which, as previously noted, was organized by five large metal-working concerns of this district, and is erecting and equipping an ordnance plant at Thirty-fifth Avenue and Burnham Street, Milwaukee. If practicable local manufacturers will organize a new company to build gun carriages, so that the complete 3-in. guns will be made here, ready for service. It is stated, however, that Milwaukee manufacturers are already so fully occupied with Government work that there is a possibility that the gun-carriage work may have to be placed elsewhere.

# CORRESPONDENCE

## Pig Iron from Steel Scrap in Great Britain

*To the Editor:* On page 497 of your Aug. 30 issue you devote editorial space to the possibilities of the electric furnace in using up cheap scrap and producing a very high grade pig iron or washed metal. In places like the Pacific coast, where pig iron is scarce or in almost any district where there is an abundance of cheap iron or steel scrap, there is no doubt that the adoption of the electric furnaces would go a very long way toward solving the problem of the present scarcity of pig iron.

It might possibly interest your readers to know the developments of this industry in Great Britain. Before the outbreak of the war the government demanded extremely rigid chemical and physical specifications for all steel for guns, shells or other ordnance. This was made almost exclusively in acid open-hearth furnaces and, in order to comply with the tests, large quantities of very pure Swedish or other similar pig iron had to be used. The Swedes found they had a better market in Germany and this, together with shipping difficulties, brought the import of Swedish pig iron very low, while the price went up from $35 to $160 per ton. Experiments were made in the Greaves-Etchells electric furnaces by several works and it was proved to be a very simple operation to make a pig iron or washed metal from shell turnings, iron borings, etc., of better analysis than the original product. The furnaces have been making this material now for over two years and from practical experience I can say that in actual works practice it gives much better results than the original Swedish iron. It is very much stronger and denser than the Swedish iron, melts more readily without cutting effects on crucibles or open-hearth bottoms and is more reliable in composition. I attribute this very largely to the freedom of the material from occluded gases, oxides and slag fibre.

I should like to congratulate the Ludlam Steel Co. on the work it has done in the United States in this new line. As far as I know, we have both worked independently and arrived at the same conclusions.

F. HODSON, President,
Electric Furnace Construction Co.
Philadelphia, Sept. 4, 1917.

## Iron Bars Rolled in Massachusetts Before 1800

*To the Editor:* Richard Gregg Lewis, whose letter you printed in your issue of Sept. 6, may be correct in regard to the first rolling mill in the United States, if he means the first rolling mill that made iron bars from ore or pig. In the first paragraph of his letter, however, he says that previous to Sept. 15, 1817, all of the bars made in the United States were *forged* and that on that date the first *rolled* bar of iron was turned out.

The Danvers Iron Works of the Sylvester Co. on the present location were rolling iron bars from Norway iron in the eighteenth century. Just how early, we do not know. These bars were brought into Boston, teamed about 20 miles to our works, heated with wood as fuel, rolled with water power and teamed back to the Boston stores.

JOHN P. SYLVESTER,
Treasurer Sylvester Co.
Danvers, Mass., Sept. 8, 1917.

## Tin-Plate Shortage in Norway

A serious shortage of tin plates exists in the canning industry of Norway as a result of the prohibition by the British Government of the export of this article to Norway, according to reports from Christiana. Ten thousand cases of tinplates for canning which were sold to Norway are under embargo till an agreement as to the prices of canned goods destined for Great Britain is concluded.

# Another Great War Bill Reported

## Proposed Expenditure Nearly Five Billions—Gun Factory at Washington Navy Yard Will Be Enlarged on an Extensive Scale—Secretary Daniels' Statement

WASHINGTON, Sept. 11.—Another stupendous war money bill, the largest and the last to be brought forward at the present session of Congress, has just been reported to the House by the Committee on Appropriations. It carries the enormous sum of $4,810,979,370, of which $3,775,979,370 is directly appropriated while contracts for $1,035,000,000 additional are authorized, the money to be provided by Congress at the session beginning next December. The bill will be passed by the House during the present week and acted upon by the Senate in time to receive the President's signature before Oct. 1.

All but a small part of the fabulous sum carried by this bill will be expended for strictly war purposes. No less than $3,477,115,735 will be allotted to the military establishment while the Navy will absorb $263,-264,480. Some of the most important items under the military establishment provided for in the measure are the following: Machine rifles, $120,277,000; machinery for manufacture of rifles, $9,500,000; mountain, field and siege cannon, $676,213,000; ammunition for mountain, field and siege cannon, $663,000,000; mobile artillery, $155,600,000; armored motor cars, $16,750,000; submarine mines and nets, $700,000; ordnance stores, $70,000,000; small arms ammunition, $39,520,000; target practice small arms ammunition, $2,000,000; and supplies, quartermaster's corps, $100,000,000.

In addition to the specific appropriations for the military establishment enumerated the bill authorizes the following contracts, the money for which will be provided hereafter: Machine rifles, $50,000,000; mountain, field and siege cannon, $225,000,000; ammunition for mountain, field and siege cannon, $700,000,000; mobile artillery, $50,000,000, and armored motor cars, $5,000,-000.

### Millions for Machinery

It will be noted that there is included in the above schedule an appropriation of $9,500,000 for machinery for the manufacture of rifles. This item is intended to cover the purchase price of the gages, dies, tools, etc., which the War Department recently contracted to buy from the British Government by which it was installed some time ago in the two plants of the Remington companies at Ilion, N. Y., and Chester, Pa., and the plant of the Winchester Repeating Arms Co. at New Haven, Conn. This machinery is being used to turn out the Lee-Enfield rifle rechambered to use Springfield ammunition. The Secretary of War solicited this appropriation many weeks ago, but as Congress delayed making the necessary provision, he was obliged to assume the responsibility of borrowing the equipment from the British authorities.

The appropriations included in the measure for the use of the naval establishment cover a broad field. The largest item is $100,000,000, which is carried as a blanket allotment to the Naval Emergency Fund for which Congress has heretofore appropriated $150,000,-000. The original fund has been substantially reduced by contracts for a considerable number of torpedo boat destroyers and Secretary Daniels has already submitted an estimate for $350,000,000 additional to pay for the 160 destroyers which he has decided to order. The fact that the appropriation recommended by the Secretary of the Navy for the additional destroyers is not included in this bill is regarded as somewhat significant and the question has been raised as to whether the entire naval emergency fund will be utilized to pay for the destroyers, leaving a deficit to be provided for next winter, or an amendment added to the bill in the Senate giving the Navy the allotment recommended by Secretary Daniels.

Chief among the items which the bill carries for the naval establishment are the following: Batteries and outfits for vessels, $22,000,000; ammunition for vessels, $25,000,000; ordnance and ordnance stores, $12,446,-480; aviation, $35,000,000; reserve ordnance supplies, $30,000,000; enlargement of gun factory, Washington navy yard, $7,500,000; handling appliances at navy yards and stations, $450,000; marine railways at yards and stations, $375,000.

### Expansion of Gun Plant

The proposed expansion of the gun factory at the Washington navy yard is a matter of special interest to private manufacturers of war material. Of the sum appropriated, $5,000,000 will be spent on new buildings and $2,500,000 on tools and machinery, the purpose being to build and equip as large a gun factory as it is possible to construct in time to be of use in the war. In explanation of the plans of the department and its policy with respect to the construction of guns, torpedoes, etc., Secretary Daniels makes the following official statement:

Contracts for guns, mounts and other ordnance supplies are becoming increasingly difficult to place. A large amount of money in advance has been allotted for the construction of shops that after the present emergency will theoretically become part of the Navy's property, although, due to the scattered locations, it will not be practicable to utilize them to the fullest extent in the Navy's activities. Funds expended in an extension to the Washington gun factory would result in quicker return of manufactured ordnance material at a decidedly less cost and give a permanent installation of great value to the Navy. Had not the Navy possessed the present factory, the supply of all ordnance material would be so much less efficient than it is at present that the matter would have undoubtedly been forced to public notice. The bureau of ordnance can order direct and obtain material from this factory, and this alone. The matter of additional guns and mounts is most urgent, demands being made by our own and other governments for such equipment.

The naval gun factory, possessing as it does a complete organization and a large working force, is readily adapted to increasing its facilities for delivery of guns, mounts and other munitions. To develop any other source is not only expensive, but involves a matter of long delay. It is, therefore, considered to the best interests of the Government to increase at once the capacity of the Washington navy yard for guns, mounts, torpedoes, mines, telescopes, sights, optical instruments and miscellaneous ordnance supplies. For this purpose it is proposed to construct the necessary buildings, craneways, storage and handling facilities at an estimated cost complete of $5,000,000, with the necessary machinery to cost $2,500,000 additional. An appropriation of $7,500,000 for this purpose is earnestly recommended.

The proposed work includes the construction of a large six-story machine shop for mines, mounts and torpedoes, a five-story pattern and woodworking shop, an extension to the power plant, a new brass foundry, an extension of the steel forging plant, an optical shop, range-finder towers, administration building, quarters for enlisted personnel under instuction and the extension of the yard service system to supply adequately these new structures.

With the accomplishment of the extensions contemplated, ample manufacturing facilities will be provided for the manufacture of from 300 to 900 torpedoes per annum, at least 3000 mines per month, a large increase in the manufacture of guns, mounts and other accessories and the manufacture and repair of the larger part of the optical work for the entire naval establishment. The present output of the torpedoes at the Washington navy yard is approximately 100 per annum. No mines are manufactured and only a small part of the naval optical work is now done. It is thus apparent that the expenditure of these funds is amply warranted as an evident and urgent military necessity. Captain Willard, the acting superintendent of the naval gun factory, estimates that after improvements requested have been completed, with the plant working at full capacity, the annual saving in cost of ordnance materials would very nearly equal the first cost of the improvements. On this basis alone the expenditure would appear to be amply justified, while on the basis of military necessity for the purpose of increasing the country's

output capacity and affording production for ordnance material that cannot be produced elsewhere, the project would seem to be an urgent need.

**Free from Usual Restrictions**

A highly significant feature of this huge appropriation bill is the fact that the enormous sums carried by it are almost without exception free from the usual restrictions compelling the manufacture of the proposed material in Government establishments rather than its purchase from private producers. Now that the war is on, Congress has discovered the folly of attempting to manufacture any considerable proportion of the material needed, and aside from providing for the extension of the gun factory at Washington, it is looking to private establishments to meet all pressing needs.

An extraordinary "rider" has been added to the bill intended to prevent persons who have been appointed from civil life at nominal salaries to help the Government in the war emergency from being transferred to other bureaus with increased compensation paid from lump sum appropriations. Such transfers and increases are specifically prohibited and it is further provided that the United States Shipping Board Emergency Fleet Corporation shall be considered as a "Government establishment" for the purpose of bringing it within the scope of this prohibition. W. L. C.

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# Status of Iron and Steel Advisers

## Attorney General Holds They May Act Providing Relation to Government Purchases Is Set Forth in a Written Statement

Attorney General Gregory, in an informal but comprehensive opinion, submitted to the War Industries Board of the Council of National Defense, holds that the service upon the sub-committees of the Advisory Commission of the Council of officers and stockholders of corporations having contractual relations with the Government is not forbidden by section 3 of the Lever food, feed and fuel control act. Copies of the opinion, which it is believed at Washington will remove all feelings of apprehension from the minds of members of the sub-committees, have been distributed by Mr. Baruch among the companies represented on advisory committees. As a result it is believed that the members of the sub-committees who have heretofore declared their purpose of resigning will abandon that intention and continue to give the Council of National Defense the benefit of their valuable assistance. It is understood that no move has been made by the Steel Committee of the American Iron and Steel Institute toward the resumption of its functions, as the members await the opinions of their attorneys, particularly in view of the Attorney General's caution in his answer to question 3.

The Attorney General's opinion is expressed in the form of questions and answers, prefaced by the text of section 3 of the Lever bill. Mr. Gregory takes up the entire organization of the War Industries Board and holds that all its operations as at present conducted are well within the law, but points to the necessity for careful observance on the part of members of the board as well as of the sub-committees of the stipulation in the Lever act that whenever a recommendation for a purchase or the awarding of a contract is made by an individual who is in any way connected with, or who has a financial interest in, the concern which is to furnish the material in question, he must file a written statement disclosing such connection or interest.

The Attorney General's opinion, which in all material particulars is in line with the suggestions heretofore made in Washington correspondence to THE IRON AGE with respect to the proper construction of the Lever act, is as follows:

F. A. Scott, Chairman War Industries Board,
Council of National Defense,
Washington, D. C.

DEAR SIR: I have your letter of Aug. 21 submitting a series of questions arising under section 3 of the Food and Fuel Control Act, approved Aug. 10, 1917, reading as follows:

SEC. 3. That no person acting either as a voluntary or paid agent or employee of the United States in any capacity, including an advisory capacity, shall solicit, induce, or attempt to induce any person or officer authorized to execute or to direct the execution of contracts on behalf of the United States to make any contract or give any order for the furnishing to the United States of work, labor, or services, or of materials, supplies, or other property of any kind or character, if such agent or employee has any pecuniary interest in such contract or order or if he or any firm of which he is a member, or corporation, joint stock company, or association of which he is an officer or stockholder, or in the pecuniary profits of which he is directly or indirectly interested, shall be a party thereto. Nor shall any agent or employee make, or permit any committee or other body of which he is a member to make, or participate in making, any recommendation concerning such contract or order to any council, board, or commission of the United States, or any member or subordinate thereof, without making to the best of his knowledge and belief a full and complete disclosure in writing to such council, board, commission, or subordinate of any and every pecuniary interest, which he may have in such contract or order and of his interest in any firm, corporation, company, or association being a party thereto. Nor shall he participate in the awarding of such contract or giving such order. Any wilful violation of any of the provisions of this section shall be punishable by a fine of not more than $10,000 or by imprisonment of not more than five years, or both; *provided*, That the provisions of this section shall not change, alter or repeal section 41 of chapter 321, Thirty-fifth Statutes at Large.

While the Attorney General is specifically authorized to give his official opinions on questions of law only to the President and the heads of the Executive Department, I think, nevertheless, that under the circumstances I am warranted in answering your questions informally. I can only speak generally, however, and not with reference to any actual case, because none is before me. You state that:

For convenience, in phrasing the questions below we shall use the term "interested person" to refer to a person having a pecuniary interest in a contract or order of the kind referred to in the act, and also to cover a person "if he, or any firm of which he is a member, or corporation, joint-stock company or association of which he is an officer or stockholder, or in the pecuniary profits of which he is directly or indirectly interested, shall be a party thereto."

We shall assume that the contract or order is the kind specified in Section 3, and that it has actually been awarded or given after the making of the recommendations referred to in the following questions:

*Question* 1: Is there compliance with the act where such interested person is a member of the War Industries Board and the board makes a recommendation to a contracting department or contracting officer with regard to such contract on order, and the interested person does not participate in making such recommendation?

*Answer:* No, not unless such interested person makes the disclosure required by the act. That he did not actually participate in the recommendation does not, in my opinion, relieve him of the duty of making the specified disclosure.

*Question* 2: Is there compliance with the act where such interested person is a member of the Purchasing

Commission of the War Industries Board and he makes a recommendation concerning such contract or order to the War Industries Board, making a full disclosure of his interest?

*Answer:* Yes.

*Question* 3: Is there compliance with the act where such interested person is a member of the Purchasing Commission of the War Industries Board and makes a recommendation directly to a contracting officer or department concerning such contract or order, making full disclosure of his interest?

*Answer:* Yes; although in view of the narrow margin of difference which might exist in a given case between *recommending*, on the one hand, and *inducing*, *soliciting* or *awarding*, on the other, it would be well as a practical matter for such persons to exercise great caution as to the kind of *recommendations* they shall make to a contracting officer.

*Question* 4: Is there compliance with the act where such interested person, being a member of the subcommittee of the Council of National Defense, makes or participates in making a recommendation concerning a contract or order to the War Industries Board, or to a council, board or commission of the United States or any member thereof, but not to a contracting department or officer, and makes a full disclosure of his interest?

*Answer:* Unless I misunderstand it, I can see no difference in principle between this question and Question 2, and therefore answer, yes.

*Question* 5: Is there compliance with the act where such an interested person is a member of the sub-committee and the sub-committee makes a recommendation concerning a contract to the War Industries Board, or to a council, board or commission of the United States or any member thereof, but not to a contracting department or officer, and such sub-committee makes a full disclosure of the interest of the interested person?

*Answer:* No. The law requires the interested person himself to disclose his interest to the council, board, commission or member or subordinate thereof to whom the recommendation is addressed.

*Question* 6: Does the provision, "Nor shall he (such interested person) participate in the awarding of such contract or giving such order," have the effect of nullifying the right to make recommendations to any council, board or commission, when accompanied by a full and complete disclosure of interest?

*Answer:* In my opinion, no. There is an obvious distinction between actually *awarding* a contract or *giving* an order and *recommending* that a contract be made or an order given.

Respectfully,
(Signed) T. W. GREGORY,
Attorney General.

Washington, D. C., Aug. 29, 1917.

## The Steel Output of India

India's steel output in 1915 and 1916 is compared as follows according to reports of the Iron, Steel and Allied Trades Federation (British):

| Class of Materials | 1915, Tons | 1916, Tons |
|---|---|---|
| Blooms, billets | .... | 2,156 |
| Rails | 15,780 | 35,097 |
| Light rails | 953 | 1,498 |
| Sleepers and fishplates | 432 | 2,217 |
| Angles, tees, channels, etc. | 5,881 | 12,680 |
| Joists | 28,481 | 25,247 |
| Merchant steel | .... | 14,149 |
| Unenumerated | 17,107 | 425 |
| Total | 68,634 | 93,469 |

## Mining Engineers to Discuss Manganese

The supply of manganese ore for the American steel industry and how to increase this in the war emergency will be one of the principal subjects discussed at the 115th meeting of the American Institute of Mining Engineers in St. Louis, Oct. 8 to 13. Members from all parts of the country will attend and zinc and lead mining operations in Missouri will figure prominently in the meeting.

# OBITUARY

C. G. STEVENSON, a well-known manufacturer of Wellsville, Ohio, died at his summer home in Oak Grove Park, near that city, on Wednesday, Sept. 5. He was president and general manager of the Stevenson Foundry Co., Wellsville, a member of the National Brick Makers' Association, and the Canadian Foundrymen's Association.

LON WESTON, president Tuck Mfg. Co., Brockton, Mass., which he founded in 1879, died in that city Sept. 5. He was born in Harrison, Me., 84 years ago, and after being graduated from Union College was an instructor in mathematics and later a civil engineer.

## The Establishment of a Shipbuilding Industry in Australia

The establishment of a shipbuilding industry in Australia is receiving serious Government consideration, and W. M. Hughes has had conferences with representatives of shipping and industrial interests. As a result of these, Mr. Hughes is satisfied that the hulls of composite ships, as well as the engines, steam and internal combustion, can be constructed in Australia, but the great difficulty is labor. It has been decided to call a conference of the unions interested in shipbuilding—boilermakers, shipwrights and engineers—at the earliest possible date in order to invite their co-operation.

## Heavy Trade with Canada

TORONTO, ONT., Sept. 9.—The feeling of uncertainty that still governs the American steel trade has reached Canadian firms which handle American steel products in the Dominion. It is declared that if the embargo imposed by the authorities extends to the United States-Canadian trade, much inconvenience will be felt. This, of course, does not apply to the steel trade as a whole, but more particularly to the Canadian firms which have recourse to the American industries for all kinds of shapes and angles. During the past few years, a tremendous iron and steel trade has been developed between the two countries. During the fiscal year which closed in July, approximately $156,333,801 worth of metals of all kinds were imported into Canada. This is $10,273,138 in excess of the amount of the business done in Canada's boom year, 1913, when the amount imported was $146,060,663. Of all the importations of iron and steel into Canada during the year just closed, 95.33 per cent was from the United States. The value of the manufactures of iron and steel brought into Canada from the United States during the past year was $119,754,265. These figures have been exceeded only once before in the Dominion's history, that was in the celebrated expansion year, 1913, when the value of these importations amounted to $120,568,284. As the aggregate of all kinds of machinery imported by Canadians, $33,154,265 came from American companies, which is approximately $2,600,000 less than in 1913 and nearly 200 per cent greater than in 1914-15 and 16.

Day and night work is being done in several of the machine shops and foundries in Birmingham, Ala., and in a few instances it is necessary to operate on Sundays by reason of the immense amount of work in hand. One of the larger machine shops and foundries shipped out the past week several car lots of shells for the Government, castings of marine engines, castings for lathes, cotton compress machinery and sugar refinery machinery. More men are being employed in machine shops and foundries in that district than ever before.

The Goshen, Va., furnace of the Southeastern Iron Corporation is expected to go in blast on or before Oct. 15.

# Ordnance and Munitions Investigation

## Testimony of Secretary Baker on Defective Ammunition and of General Crozier on Ordnance Bureau's Delays on Rifles

WASHINGTON, Sept. 11.—What promises to develop into a comprehensive series of investigations of the Ordnance Bureau of the War Department was begun on Sept. 5, when the Senate Committee on Military Affairs examined Secretary of War Baker, General Crozier, chief of the Ordnance Bureau; Colonel Thompson, assistant in charge of small arms, and Chief Chemist Pritham of the Frankford Arsenal, concerning the defective ammunition supplied to the troops in France under General Pershing's command. Simultaneously the House Committee on Military Affairs reported a resolution authorizing a select committee of seven members "to inquire into the manufacture and purchase of ordnance and ammunition, including small arms ammunition and heavy artillery for use by the armed forces of the United States in the present emergency." It was also announced that the Secretary of War, pursuant to request from General Crozier, had appointed a board to make an exhaustive investigation into the cause of the defects which have been found in the ammunition made at Frankford and the methods of inspection which should be employed to guard against such defects.

The hearings before the Senate Committee on Military Affairs were not confined to the defective ammunition supplied to the troops in France, but afforded an opportunity for the ordnance experts to make an official explanation of the obstacles that have been encountered in securing prompt deliveries of Lee-Enfield rifles, due chiefly to the failure of the British Government to standardize the equipment for the manufacture of these guns in the three plants recently turned over to the United States. The committee received this information with great apparent interest and examined General Crozier in much detail as to the embarrassing situation in which the War Department found itself when the United States became involved in the war, because of the failure of Congress to provide the equipment for the production of small arms in private establishments.

### Chemical Change in Ammunition

Secretary Baker, in a statement concerning the defective ammunition made at Frankford Arsenal, said that after the European war had been in progress for some time the supply of potassium chlorate used in the manufacture of primers for small-arms cartridges, being no longer procurable in Germany, was purchased in the United States. The product was subjected to the usual analysis and test at the Frankford Arsenal and was apparently in all respects up to the standard requirements. In May the War Department received from the Navy Department a complaint that in the target practice of the marines who were using ammunition supplied by the Frankford Arsenal there were occasional cases of miss-fire or hang-fire. Subsequently a report was received from a rifle club to which ammunition made in Frankford had been sold, also complaining of hang-fire.

Investigation was at once ordered and an ammunition chemist and several ordnance experts began an exhaustive inquiry. No such trouble had ever been heard of and a number of different theories were advanced as to its cause. It was at first thought that the granulation of the antimony used in the primers was either too fine or too coarse and considerable time was devoted to this line of investigation before it was abandoned. It was finally determined that the potassium chlorate contained an infinitesimal quantity of potassium bromate, which, in the presence of free sulphur in the primer, had a tendency to break down, leaving as one of the by-products of the chemical reaction a small amount of free sulphuric acid, which delayed the combustion of the primer and caused the hang-fire. The deterioration of the priming material, Secretary Baker said, did not manifest itself immediately after the ammunition was manufactured, but was a very slow process, probably depending to some extent on the presence of an exceedingly small quantity of moisture in certain of the cartridges. Under these conditions practically all the ammunition when made and immediately tested functioned properly, but when kept for some months began slowly to deteriorate, so that in three or four months about 10 per cent would hang-fire.

### All from Frankford Arsenal

Replying to questions by members of the committee Secretary Baker said that the work done in the arsenals in the manufacture of ammunition was about equal to that in private factories. Sometimes it appeared to be a little better and sometimes not quite so good, but there was no marked disparity. All the defective ammunition, he said, could be used up in target practice under such conditions that the soldiers could be warned not to open the breeches of their guns until sufficient time had elapsed to take up any hang-fire. The defective ammunition constituted only about one-third the amount sent to France and was easily identified as the product of the Frankford Arsenal, being plainly marked. An ample supply of good ammunition was sent to France before any of that originally shipped was used.

Replying to questions as to whether the Allies had had similar troubles, Secretary Baker said that he did not know that they had experienced exactly the same difficulties. He added that a very large quantity of ammunition used on every battlefield does not explode. On the western front of Europe the fields are covered with unexploded cartridges, but the War Department had no definite data as to the cause of the defects. Answering the question as to whether ammunition produced by private concerns had ever developed the difficulty encountered in the case of that produced at Frankford, the Secretary said that he was informed that no such trouble had ever been traced to the same cause in the case of the output of private concerns, the explanation being that they use a different fulminate, usually employing fulminate of mercury or fulminating powders, which do not contain sulphur.

### No Conspiracy Indicated

Chairman Chamberlain of the committee examined Secretary Baker at some length as to whether there was any reason to suspect that the defective ammunition was in any way due to the machinations of evily disposed persons, but the Secretary declared that there was not the slightest evidence of such interference. On the other hand, all who had taken part in the investigation were satisfied that the trouble was due to a wholly unforeseen cause, something entirely new in the technical experience of ammunition makers.

Asked why the arsenals did not employ fulminate of mercury instead of potassium chlorate in making primers, General Crozier said that fulminate of mercury had the effect of splitting the brass cartridge cases so that they could not be used again. As all the ammunition used by the Army in recent years was for target practice, it was practicable to save the cartridge cases and, therefore, a fulminate was employed which did not injure them. Since the United States has become involved in the war this point is no longer material, as there will be little or no salvage of cases. On this account the department had given permission to private manufacturers making ammunition for the Government to use a mercurial fulminate for primers. Since the discovery with regard to the presence of potassium bromate in the primers the department had come to consider the mercurial fulminate more desir-

able than the potassium chlorate, as it regarded safety as of more importance than salvage.

Dr. H. C. Pritham, chief chemist at the Frankford Arsenal, testified that all the chlorate of potassium purchased was of U. S. Pharmacopoeia standard and was carefully examined for all suspected impurities. No special test for potassium bromate had been made, as no such contamination had ever been encountered.

General Crozier, in reply to direct questions by members of the committee, stated that he did not think the trouble in this case "could have reasonably been avoided," but in view of what has happened it can easily be provided against in the future. He added that in the manufacture of material in large quantity there was always a conflict between excellence and output and the point at which they balance must be something of a compromise. In the case of ammunition, however, every effort was made to secure an article both safe and effective.

### Delays in Rifle Manufacture

Taking as a text the proposition that in manufacturing material in large quantity a conflict between excellence and output always arises, General Crozier drew the committee's attention to recently published statements concerning delays in the manufacture of rifles at the three plants where the United States has acquired equipment originally installed to take care of a large contract for the British Government.

"We have been facing a serious problem," said General Crozier, "in the manufacture of rifles to quickly supplement our supply. We have been obliged to adopt the British Enfield rifle modified so as to fire our ammunition made for the Springfield rifle. The Enfield is now being made for us at three private factories. We did not have a sufficient number of Springfields to meet the sudden demand.

"Now, when the manufacture of Enfields was decided upon we had to determine two points, the first of which was, should we make them so as to use the United States ammunition instead of the English ammunition? For important reasons it was considered advisable to use United States ammunition, one reason being that we had a considerable amount on hand made for use in Springfields. The factories which had been making guns for the British Government could, of course, go ahead turning out Enfield rifles for English ammunition with less interruption, but we determined that to secure quality of supply, that is to say, for the sake of uniformity, which is an important factor in quality of supply, it was worth the time to make the change; hence we provided that the chambers of the Enfields should fit the Springfield ammunition.

### Interchangeability of Parts

"The second question was a serious one. The British were so pressed for rifles that they considered it worth while to proceed with the manufacture of the Enfield at three different factories so rapidly as to make impossible interchangeability of parts between the rifles manufactured at the different places. Interchangeability requires an accurate co-ordination of gages and a co-ordination of inspection which require time and effort. The British authorities thought it was worth while to forego it to secure quantity production and, therefore, the rifles made at these three places are not interchangeable in all their parts. We have always insisted upon interchangeability and, although we make our Springfield rifle at the Springfield armory in Massachusetts and at the arsenal at Rock Island, Ill., we have always secured practical interchangeability. Of course, to apply this rule to the Enfield involved delay. It would take a certain amount of time to secure a certain degree of interchangeability, that is to say, in rendering interchangeable certain important parts of the rifle, and it would take more time if we insisted on a higher degree, or that a larger number of parts should be interchangeable, and even more time would be required if we attempted to secure 100 per cent interchangeability.

"We decided to stop at the second point and we have devoted the time necessary to secure interchangeability between the output of the three plants in what we consider the important parts of the rifle. The result will probably be that while there will be an ample supply of rifles for the army before any fighting begins, we shall probably have troops in camp and under training before there will be a rifle for every man. We think it probable that there will not be a worse state of affairs than that one company may have to use certain rifles in the morning and another company use the same rifles in the afternoon. We are already satisfied that it will not be necessary to send any soldier abroad without either a thoroughly modern Springfield or Enfield rifle."

In answer to questions General Crozier said that the English and French armies use different ammunition and that both types differed again from that supplied to the American forces. It was unfortunate that each force was dependent upon its own supply, but under the circumstances it was impossible to provide interchangeable ammunition.

### Previous War Orders Fortunate

"If our industries had not been speeded up by the existence of the war prior to our entry into it," suggested Senator Frelinghuysen, "we would have been in much worse shape, would we not?"

"In very much worse shape," replied General Crozier. "We are vastly better off on account of the European demand for material in this country since the beginning of the war. The British were caught at the outbreak of the war with a rifle with which they were not very well satisfied. They had just about worked up to the manufacturing stage a new model rifle which they intended to substitute for the one they had been using. Of course, they were obliged to greatly increase their supply of rifles and they had to turn to this country to help them, while at the same time increase their own manufacture at home. They wished to have manufactured in the United States the new model, but they considered it inadvisable to have it made, as had been designed, for a different kind of ammunition from that which they had previously employed. The newly designed rifle would not use the ammunition employed with the old model British rifle, so the problem presented to our manufacturers was to take this new rifle and so alter it that it would use the older and less desirable type of ammunition."

### Will Rifle Supply Be Sufficient?

Concerning the possibility of equipping an army of two million men in the field by next summer, General Crozier expressed the opinion that inasmuch as only 60 per cent of such a force would carry rifles, he believed the Ordnance Bureau would be fully equal to the task. Senator Frelinghuysen suggested that the British Government estimated about five rifles to a man on account of wastage.

"That estimate was made," responded General Crozier, "very early in the European war, when the wastage due to the hasty retreat of the French and British forces was prominent in everybody's mind, but the estimate has now been very greatly reduced. If we have an army of a million and a quarter carrying rifles we shall have ample facilities to supply them. The English and French Allies do not now need any more of our assistance in rifle making. We have some facilities which are being used for the Russians and for the Belgians, but this is not a large percentage of our capacity. We shall be able to meet all our own requirements and still have some facilities left for the Allies I have mentioned."

### Artillery Investigation Also

There has as yet been made no disclosure of the detailed plans of the House Military Committee for investigating the Ordnance Bureau. It is understood, however, that considerable information has reached the committee respecting the production of heavy artillery, gun forgings, etc., which it wishes to sift carefully. On this account the Dent resolution, which originally provided for an inquiry limited to the small arms ammunition made at the Frankford Arsenal, was enlarged in scope to include "heavy artillery for use by the armed forces of the United States in the present emergency." This resolution has been adopted by the House and the following committee appointed: Representatives

Dent, Fields, Fess, Gordon, Shallenberger, Anthony, McKenzie, Greene and Morin.

The board appointed by the Secretary of War to investigate the manufacture of ammunition in the arsenals is composed of Dr. H. P. Talbot, professor of chemistry at the Massachusetts Institute of Technology; Dr. C. L. Parson, chief chemist of the Bureau of Mines, and an army officer to be designated by Maj.-Gen. Hugh L. Scott, chief of staff. W. L. C.

## PERSONAL

Samuel A. Benner, general manager of sales, American Steel Export Co., becomes a vice-president on Sept. 17 of the Federal Export Corporation, 115 Broadway, New York, of which D. S. Guthrie is also vice-president. The Commercial Iron & Steel Co., its subsidiary, will continue to develop as an institution devoted to domestic business.

Henry Penton, of Babcock & Penton, naval architects, New York and Cleveland, has been called into the service of the United States Government by the United States Emergency Fleet Corporation and placed in charge of the extensive shipbuilding program of the Shipping Board on the Great Lakes, where vessels will be built by a number of plants for the Government and taken through the Welland Canal to the Atlantic Ocean. Mr. Penton has had long experience in shipbuilding. He has opened an office for the Government in the Perry-Payne Bldg., Cleveland.

James Nelson, in charge of the duplex department of the Bethlehem Steel Co. at Bethlehem, Pa., for some time, has resigned to return to the Algoma Steel Co. at Sault Ste. Marie, Ontario. Mr. Nelson was for years superintendent of the open hearth department of the Ohio Works, Carnegie Steel Co., Youngstown, and went from there to Sault Ste. Marie to take a similar position. He went from Canada to Bethlehem and will return about Oct. 1.

Myron C. Sumners has been appointed sales manager of the DeForest Sheet & Tin Plate Co., Niles, Ohio, succeeding C. N. Stewart, who is associated with the recently organized Valley Iron Co., Youngstown, Ohio. Mr. Sumners was formerly assistant general sales manager of the Canton Sheet Steel Co., Canton, Ohio.

B. A. Shutts, superintendent of the North Cornwall furnaces, Lebanon, Pa., who resigned to become superintendent of the Central Iron & Steel Co.'s plants, Harrisburg, Pa., was tendered a banquet by his associates and presented a handsome watch and chain.

Dr. H. B. North, associate professor of chemistry, Rutgers College, resigned recently to become director of the Research Laboratories of the York Metal & Alloy Co., York, Pa.

A. D. Shankland has been appointed chief chemist at the Saucon laboratory of the Bethlehem Steel Co., succeeding F. O. Kichline, who has been transferred to the American Iron & Steel plant, open hearth department, Lebanon, Pa. A. R. Hartzel has been appointed chemist, succeeding Mr. Shankland.

Edward O. Acker, metallurgist for the Bethlehem Steel Co. for the last 29 years, has resigned and retired from active work.

Stanton Freeman has resigned his position as general manager of the Carbon Iron & Steel Co., Parryville, Pa., to become secretary and treasurer of the Port Henry Iron Ore Co., with offices at 2 Rector Street, New York. Mr. Freeman, who is a graduate of the Ohio State University, class of '98, was connected with the Carbon Iron & Steel Co. for 18 years.

C. E. Jenkins, Allentown, Pa., formerly engineer of maintenance of way for the Lehigh Valley Transit Co., has been appointed construction engineer for the Traylor Shipbuilding Co., Cornwells, Pa.

Ferdinand W. Roebling, Jr., treasurer of the John A. Roebling Sons' Co., Trenton, N. J., has been elected a director and member of the executive committee of the Mechanics and Metals National Bank, New York, to succeed his father, recently deceased.

Arthur Booth, formerly assistant general purchasing agent of the Philadelphia Co., Pittsburgh, has resigned, and is now vice-president of the Burson Supply Co., 242 First Avenue, Pittsburgh, dealer in mill, mine, machinists', railroad, contractors', gas and oil well supplies.

Chester H. Lehman, for six years secretary and director of the Blaw-Knox Co., Pittsburgh, has entered the service of the United States Government for duration of the war as first lieutenant in the Ordnance Department. Mr. Lehman is a Harvard graduate, class of 1909. Communications for him should be addressed care of the Blaw-Knox Co., Farmers' Bank Building, Pittsburgh.

Geo. F. Alderdice, vice-president of the Brier Hill Steel Co., Youngstown, Ohio, is recuperating at Atlantic City from an operation for appendicitis.

A. L. Phelps, formerly superintendent of the Youngstown, Ohio, plant of the United Engineering & Foundry Co., has resigned to accept a position with the National Carbon Co., Niagara Falls, N. Y., and has assumed his new duties.

Howard F. Ingels, formerly with the William Tod Co., and later with the Realty Guarantee & Trust Co., Youngstown, Ohio, has been named assistant secretary of the War Industries Board and has asked for an indefinite leave of absence.

Dudley R. Kennedy, assistant to the president of the Youngstown Sheet & Tube Co., has been named by Gov. J. M. Cox of Ohio, a member of a commission to study health, old age insurance and sickness prevention as a basis for State legislation.

Paul Brennan, formerly sales manager of the Lawrenceville Bronze Co., Pittsburgh, is now connected with the Johnson Bronze Co., New Castle, Pa.

Ralph T. Haws has been appointed general manager, secretary and treasurer of the Climax Fire Brick Co., Climax, Pa., succeeding Charles H. Luke, resigned.

James Lloyd has been appointed general superintendent of the operating department of the Sharon Steel Hoop Co., Sharon, Pa. Mr. Lloyd for the last few years has been assistant superintendent of the steel works department in the Jones & Laughlin Steel Co. plant, South Side, Pittsburgh.

W. J. Nugent, formerly with the Sivyer Steel Casting Co., Milwaukee, Wis., has become associated with the Springfield, Ohio, plant of the Ohio Steel Foundry Co. as assistant to the vice-president.

George W. Wagstaff, formerly in charge of the Detroit, Toledo, and Cleveland districts for the Onondaga Steel Co., Inc., Syracuse, N. Y., has been appointed sales manager, and will be located at the general offices of the company at Syracuse.

Joseph T. Ryerson & Son, Chicago, have sent two of their engineers to the foreign field to act in a consulting capacity with their foreign agents. Paul H. Schatzmann sailed two weeks ago for Japan, China and Russia, and Marcel Cartier has just sailed from New York for France and Italy.

René F. Jacops, for eight years in charge of the export department in New York of the Keystone Driller Co., Beaver Falls, Pa., has joined the American Machinery Syndicate, Hudson Terminal Building, New York, which is a selling organization particularly for business in Spain for a group of some 38 American manufacturers in metal working lines.

B. S. Cutler, Washington, acting chief of the Bureau of Foreign and Domestic Commerce, now represents the Department of Commerce on the Tin Plate Conservation Committee, succeeding Dr. E. E. Pratt. Chauncey P. Carter, also of the Bureau of Foreign and Domestic Commerce, is secretary of the committee.

H. E. Derbyshire, general manager of the Chambersburg Engineering Co., Chambersburg, Pa., has resigned, effective Sept. 10.

# Machinery Markets and News of the Works

## AIRPLANE MAKERS BUYING

### General Vehicle Co. May Close This Week

### Gun Plants Are Also in the Market for Considerable Equipment—Tacony Ordnance Corporation Places Some Orders

The Government program for airplanes and heavy guns is furnishing the bulk of the business now being done in machine tools, with the shipbuilding industry promising to loom up as a big buyer in the very near future.

Interest of the New York machine-tool dealers the past week has been centered largely on the prospective large purchases of the General Vehicle Co., Long Island City, N. Y., which will be begun this week. Lists sent to the trade for bids totalled about 900 machines. The Simplex Automobile Co., New Brunswick, N. J., may begin placing orders at any time, and will need about 200 machines, about 100 of which were included in its recent list, and a second list will be issued soon. The Trego Motors Corporation, New Haven, Conn., has about concluded its buying, which is understood to have included about 100 machine tools.

Gun plants are large buyers, particularly in Philadelphia. The Tacony Ordnance Corporation has closed for the greater part of its list of machine tools for the rough machining of gun forgings, and will probably place an order this week for 21 cranes needed for open-hearth furnace building, forge shop and machine shop. The Taylor-Wharton Iron & Steel Co., which is building a large addition at its Tioga plant, Philadelphia, did not cover all of its requirements in its recent purchases, and will be in the market for other equipment as soon as its needs for gun forging and machining are fully known. The Standard Steel Works Co., Philadelphia, has issued lists for additional purchases of machine tools for its Burnham, Pa., plant, where 6-in. guns will be forged and rough machined. Most of this buying will be done in Philadelphia. A large part of the orders of the Bullard Machine Tool Co., Bridgeport, Conn., has been placed in New York and New England. The total purchases of the company are said to aggregate $750,000 and about $1,000,000 worth in all will be bought. The American Brake Shoe & Foundry Co., Erie, Pa., has been placing additional orders in New York for its gun plant. The Inland Ordnance Co., Bedford, Ohio, has been doing considerable buying in Cleveland. A manufacturer of the Central West has placed an order for 60 turret lathes for making rifle grenades and attachments for putting on the end of rifles for loading these grenades.

The impression prevails in the trade that the Government is now having difficulty in finding manufacturers who are in a position to take on ordnance and munition work. A number of large projects are pending, but negotiations have not yet reached a point that announcements can be made as to plans. Several companies in the East have been quietly inquiring for equipment and are expected to come into the market soon. Three of these projects are for machining of guns. A Government representative recently visited a number of large metal-working plants in Cincinnati and vicinity to make arrangements for the building of gun mounts, but is said to have met with little success owing to the overcrowded conditions of plants having suitable equipment for this work.

Little information has yet come to builders of cranes and plate-working machinery as to the requirements of the two shipyards to be established by the American International Corporation, at Hog Island, near Philadelphia, and by the Submarine Boat Corporation and Lackawanna Bridge Co., near Newark. Inquiries at the offices of these companies have revealed that they are not yet ready to proceed with the buying of equipment. It is presumed likely that these two plants will require a large number of cranes. Lists are expected within a week. Christoffer Hannevig, Inc., 139 Broadway, New York, which owns controlling interests in the Pennsylvania Shipbuilding Co., New Jersey Shipbuilding Co. and the Pusey & Jones Co., has chartered the Newfoundland Shipbuilding Co., Harbor Grace, Newfoundland. Wooden ships will be built in the immediate future, but a steel shipbuilding plant is being planned and complete equipment will be required. The company is now inquiring through the Norbom Engineering Co., Philadelphia, for five three-ton overhead electric cranes of 60-ft. span. A new shipbuilding company has been organized at Kingston, N. Y., by John Schoolmaker and associates, and will build small vessels for the Government. Equipment for fabricating steel will be bought and tools for machine shop. The Fort Mifflin Shipbuilding Co., Philadelphia, which has been promoted by men experienced in shipbuilding, has acquired a site in Philadelphia, and if certain expected contracts are closed, will come into the market in about 30 days for complete equipment for a modern plant. The Federal Shipbuilding Co., New York, is reported to have bought a large number of second-hand machines in Canada. This company has placed an order with the Norbom Engineering Co., Philadelphia, for 10 plate punch tables.

There is a good volume of miscellaneous business in all markets, but the past week was not as productive of new inquiries of large size as previous weeks. The Ingersoll-Rand Co. is buying for its plant at Johannesburg, South Africa. The Tock Screw Machine Products Co. has been buying screw machines for its new factory at Long Island City, N. Y. The Autocar Co., Ardmore, Pa., is placing orders and will buy about $200,000 worth of new equipment for additions to its plant. The North American Motors Corporation, Pottstown, Pa., is inquiring in Philadelphia and will probably buy soon for a Government shell contract. The Budd Mfg. Co., Philadelphia, the Wright Roller Bearing Co., Philadelphia,

the Nice Ball Bearing Co., Philadelphia, the Silvex Co., Hellertown, Pa., and the Keystone Motor Mfg. Co., East Greenville, Pa., are inquiring or buying in the Philadelphia market. The Rock Island Arsenal has been a persistent buyer in Chicago. The Western Rope & Mfg. Co., Milwaukee, Wis., the Edward Valve & Mfg. Co., East Chicago, Ill., and the Canadian Car & Foundry Co., Jeffersonville, Ind., have been buying in Chicago.

Many crane builders are indifferent to new inquiries because of the sold-up condition of their plants. Bids for eight cranes for the Watertown Arsenal were opened by Stone & Webster, Boston, last week. The Link-Belt Co. is building eight gantry cranes for use in France. The Fore River Shipbuilding Corporation, Quincy, Mass., is in the market for a few small cranes.

Commandeering by the Government of machine tools and cranes continues, though it has not been necessary to resort to this method to a very great extent. Some confusion has resulted from the practice of the Government to hold up the placing of orders until long after the time specified in the bids. In not a few instances the Government has been notified that it has delayed too long and that meanwhile prices have been advanced. The result in such cases is that the Government places the order at the bid price, commandeers the tools, pays 75 per cent of the price and advises the seller to put in a claim for the remaining 25 per cent, with a statement showing on what additional material and labor costs the advance in price is based.

## New York

NEW YORK, Sept. 11.

The New York machinery trade has been more nearly in a waiting attitude during the past week than at any time since the United States entered the war. There was almost an entire absence of large new business, though many rumors are in the air as to pending projects. The interest in the recent list of the General Vehicle Co., Long Island City, N. Y., is widespread and machine-tool offices have been busy preparing estimates on the tremendous requirements of this company. It is expected that orders will be placed this week for many of the tools. All will be motor-driven and the order for motors alone will be a large one. Likewise, the machine-tool trade is still waiting for the Simplex Automobile Co., New Brunswick, N. J., to close on about 100 tools, for which lists were recently issued. The Simplex plant will probably require about 200 new tools, and another list is expected soon. The Trego Motors Corporation, New Haven, Conn., is reported to have closed for a large part of its requirements, totaling about 100 machine tools.

The Bullard Machine Tool Co., Bridgeport, Conn., has closed for about $750,000 worth of equipment, and will purchase more, about $1,000,000 worth in all, according to reports. The American Brake Shoe & Foundry Co., Erie, Pa., has been buying during the week for its gun-machining plant. Other concerns are now negotiating with the Government to machine heavy guns, but matters are still too indefinite for publication.

The American International Corporation and the Submarine Boat Corporation, which will build plants at Philadelphia and at Newark for building steel ships for the Emergency Fleet Corporation, have not at this time proceeded far enough with their plants to discuss the subject of equipment. Concerns inquiring at their offices have been asked to take the matter up again in about a week. It is reported that the orders for cranes will be very large. The Federal Shipbuilding Co. has bought 10 plate punch tables from the Norbom Engineering Co., Philadelphia, and is said to have obtained considerable second-hand machinery in Canada.

Christoffer Hannevig, Inc., 139 Broadway, New York, which owns the controlling interest in the Pennsylvania Shipbuilding Co., the New Jersey Shipbuilding Co. and the Pusey & Jones Co., has organized the Newfoundland Shipbuilding Co., which is building a plant at Harbor Grace, Newfoundland. This concern has sent out an inquiry, through the Norbom Engineering Co., Denckla Building, Philadelphia, for five 3-ton overhead electric cranes of 60 ft. span. Deliveries in four months are asked.

John D. Schoolnaker and associates, Kingston, N. Y., have organized a shipbuilding company and will build small steel vessels for the United States Government. Some equipment has been bought, and it is understood the company will be in the market for plate-working machinery for a fabricating shop. The Oltmer Iron Works, Hoboken, N. J., is in the market for punching and shearing machinery for its fabricating plant.

The Tock Screw Machine Products Co., Long Island City, N. Y., is buying screw machines for its new plant.

The Link-Belt Co., Philadelphia, has received an order for eight gantry cranes for use in France. The Union Pacific Railroad has closed for five cranes. The Fore River Shipbuilding Corporation is in the market for a few small cranes. Stone & Webster, Boston, on Thursday last, opened bids for eight cranes for the Watertown Arsenal. There were several bidders. The cranes wanted are four 10-ton, one 20-ton, one 30-ton and two 40-ton.

The Ingersoll-Rand Co., New York, is buying for its plant at Johannesburg, South Africa.

The W. F. Davis Machine Tool Co. has moved its offices from the fourth floor of the Singer Building to the ninth floor, where considerably more space has been taken.

The Morse Dry Dock & Repair Co., 17 Battery Place, New York, has awarded a contract for the erection of its new two-story machine shop about 100 x 200 ft., at First Avenue and Fifty-sixth Street, Brooklyn, to cost $50,000.

The Prospect Tool & Machine Co., New York, has been incorporated with a nominal capital of $5,000 to manufacture engines and boilers, machine shop and foundry supplies. J. H. Hamer, J. R. Zimmerman and M. Biedermann, 521 East 149th Street, are the incorporators.

The Todd Shipyard Corporation, 15 Whitehall Street, New York, is having revised plans prepared for its proposed new three-story building about 100 x 150 ft., to be erected on Third Avenue, near Twenty-fourth Street, estimated to cost $70,000.

The Laparmentier Shipbuilding Corporation, New York, has been incorporated with a capital of $20,000 to operate a local shipbuilding plant. E. T. Child and J. Boero, 1482 Broadway, are the principal incorporators.

The R. & L. Bearings Co., New York, has been incorporated with a capital of $10,000 to manufacture journal bearings and allied specialties. P. B. Rose, L. L. Lichstenstadter and L. Biel, 885 West End Avenue, are the incorporators.

The Premier Metal Etching Co., Long Island City, N. Y., will erect a two-story and basement building, about 75 x 210 ft., at Van Alst Avenue and Fourteenth Street, Long Island City, at a cost of about $75,000.

The Hudson Brass Works, 16 Nassau Street, Brooklyn, N. Y., has increased its capital from $15,000 to $150,000.

The Karmel Mfg. Co., Brooklyn, has been incorporated with a nominal capital of $5,000 to manufacture metal ware products. C. Marx and C. Karmel, 242 Ainslie Street, are the incorporators.

The Rolls-Royce Co., Ltd., 671 Fifth Avenue, New York, manufacturer of automobiles, has acquired property at Harris Avenue and Sunswick Street, Long Island City, for a new repair works. A one-story, reinforced-concrete building will be erected, about 100 x 135 ft.

The Automatic Straight Airbrake Co., New York, has been incorporated in Delaware with a capital of $25,000,000 to manufacture airbrakes. Louis C. Haggerty, Herbert H. Ramsay and Thomas J. Ward, New York, are the incorporators.

The Grand Talking Machine Co., Brooklyn, has been incorporated with a nominal capital of $5,000. S. H. Gottlieb and H. A. Kaplan, 230 West Fourteenth treet, are the incorporators.

Charles Kaiser, 216 Himrod Street, Brooklyn, has had plans prepared for a one-story building about 20 x 40 ft., on Prospect Avenue, near Woodbine Street, to manufacture thermometers.

The American Mailing Machine Co., New York, has been incorporated in Delaware with capital of $250,000 to manufacture automatic sealing and stamping machines. Arthur W. Britton, Samuel B. Howard and John A. Moore, New York, are the incorporators.

The Single Service Package Corporation of America, 326 Hudson Street, New York, has had plans prepared for the erection of a plant on the Saw Mill River Road, Yonkers, N. Y. A. R. Turner is president.

The Clark & Norton Mfg. Co., South Main Street, Wellsville, N. Y., manufacturer of gas engines and oil well machinery, has increased its capital from $165,000 to $215,000.

The General Electric Co., Schenectady, N. Y., is reported to be planning for the construction of a new plant at Cold Spring, N. Y., the coming year. J. A. Wood, 50 Church Street, New York, is consulting architect.

The Jamestown Auto Parts Mfg. Co., Jamestown, N. Y., is building a two-story addition to its plant on Steele Street. Oscar Lanna is president.

The Porter-Cable Machinery Co., 501 East Water Street, Syracuse, N. Y., manufacturer of machinery and machine tools, has acquired a portion of the factory of the Harvey A. Moyer Co., carriage manufacturer, at North Salina and Free Streets, consisting of a five-story building, about 60 x 150 ft., and a smaller two-story structure. It will be used for increasing the capacity and is expected to give employment to about 150 additional men. Walter A. Ridings heads the company.

The Continental Can Co., Syracuse, has awarded a contract for the erection of an addition to its plant at East Water Street and University Avenue, to cost about $60,000.

The Buffalo Truck & Tractor Co., Buffalo, has been incorporated with a capital of $150,000 to manufacture motors, trucks, etc. G. B. Burd, Buffalo, E. H. Oversmith, and S. B. Simpkins, are the incorporators.

The Delwood Elevator Co., Buffalo, manufacturer of elevators, etc., has increased its capital from $10,000 to $450,000.

A one-story, brick and steel power plant, 50 x 160 ft., will be erected by the Curtiss Aeroplane & Motor Co., in connection with its new works on Elmwood Avenue. The Austin Co., Cleveland, has the contract.

The Ford Motor Co., Highland Park, Detroit, is having plans prepared for the construction of a four-story reinforced-concrete assembling plant on Newark Bay, Kearney, N. J. G. Plaintiff, 1723 Broadway, New York, is manager.

The National Hoisting Engine Co., 313 Manor Avenue, Harrison, N. J., has awarded a contract for an addition to its machine shop to cost about $20,000.

The Crucible Steel Co., Harrison, N. J., will erect a brick and steel press and forge shop addition, about 225 x 425 ft., to cost approximately $390,000.

The Air Reduction Co., 120 Broadway, New York, is taking bids for the construction of a two-story reinforced-concrete addition, about 75 x 100 ft., to its plant on Pacific Avenue, Jersey City, N. J.

The D'Amour Machine Co., 239 Washington Street, Jersey City, has been incorporated with a capital of $100,000 to manufacture machinery. The incorporators are Edward D'Amour, Brooklyn; H. C. Gilson, and Otto E. Enell, Jersey City.

## New England

BOSTON, Sept. 10.

For the first time in several weeks the local machine tool market has been enlivened by the issuing of two big inquiries originating in New England. One list is for equipment for a plant of an electric company and calls for 99 items, mostly large sizes of boring mills, lathes, planers, milling machines, radial drills and some other equipment. Both lists are being held confidential. The latter is issued by a local corporation acting in behalf of the Government and the machine tools are to be used in a gun repair plant to be established by the Government. The inquiry is for a complete equipment for a large machine shop, calling for motor-equipped tools and for delivery in November.

The situation in most New England machine building plants is unchanged and the inquiries that have been pending for weeks, and in some cases for months, are still inactive, as the expected Government contracts have not been placed. The production of some plants is becoming somewhat demoralized as they have refrained from taking large orders from private industries in the expectation that they were to devote their energies largely to Government work.

The feeling is well-defined that huge Government business will soon be forthcoming and the demand for labor will be such that wages will again soar. The calling out of drafted men for examination continues a disturbing influence and as men well down on the draft lists are being summoned, manufacturers are being more strongly impressed that the integrity of their skilled working force is being seriously threatened, for the attitude of the appeal boards shows no disposition toward exemption under industrial appeal unless the appeal is strongly fortified by indisputable evidence of the need of such exemption.

The Torrington Co., Torrington, Conn., as one of its steps in changing from a holding to an operating company, has taken over the plants of the Excelsior Needle Co. in Torrington and in Chicopee, Mass.

The American Brass Co. has awarded a contract for a one-story building, 173 x 200 ft.

The Wright Wire Co., Worcester, Mass., is putting in the foundation for a tempering building, 92 x 200 ft., one story, at its Palmer, Mass., plant.

The Chase Metal Works, Waterbury, Conn., has begun the erection of a one-story building, 60 x 120 ft.

The Chase Rolling Mills Co., Waterbury, Conn., is erecting a storage building, 67 x 74 ft., on Orange Street.

The Heald Machine Co., Worcester, Mass., has awarded contracts for an addition to its machine shop, to cost $30,000.

The Jones & Lamson Machine Co., Springfield, Vt., has awarded contracts for a machine shop, one story, 120 x 400 ft., and a power house one story, 30 x 60 ft.

The Rimmon Eylet Co., Seymour, Conn., has awarded a contract for a two-story factory, 50 x 125 ft.

The Klinch Mfg. Co., Boston, has been incorporated with authorized capital stock of $40,000 to manufacture hardware, metal and woodenware. Frank S. Elliot is president and Irvin L. Lindabury, Malden, Mass., treasurer.

The Waltham Watch Co., Waltham, Mass., is building a one-story addition, 35 x 150 ft.

The plant of the East Greenwich Iron & Metal Co., East Greenwich, Conn., was destroyed by fire, Sept. 6.

The National Foundry Co., East Whitman, Mass., has begun the construction of a one-story addition, 60 x 100 ft.

The New Remington Rifle Co., Bridgeport, Conn., has been incorporated with capital stock of $100,000 to manufacture fire arms. The incorporaters are Francis E. Jones and John T. Robinson, both of Hartford, and George F. Jebbett of New York.

The Graton & Knight Mfg. Co., Worcester, Mass., is building a storage building, 126 x 176 ft., three stories.

The Harriman Motors Co., South Glastonbury, Conn., which has a contract to build 1200 heavy airplanes for the Government, is reported to be about to move to Southington, Conn., where it will occupy the factory buildings of the Barnes & Kobert Mfg. Co., recently vacated. A tract of land consisting of nearly 100 acres of level ground has been secured near the factory for use as a proving ground.

The Houstatonic Shipbuilding Co., Bridgeport, Conn., has secured from the Government a contract for 10 3000-ton ships at a lump sum of $3,100,000. Work on the vessels will begin at once and the contract calls for delivery within 18 months. Simon Lake of the Lake Torpedo Boat Co., Bridgeport, and Archibald and Kenneth McNeil of the same city are officers of the company.

## Philadelphia

PHILADELPHIA, Sept. 11.

The machine-tool requirements of the new gun-forging plants in or near Philadelphia are occupying the attention of the Philadelphia machinery trade. The Tacony Ordnance Corporation has closed for nearly all of the machines on its recent list, but has not yet bought the 21 cranes it inquired for. The Taylor-Wharton Iron & Steel Co., which is building a large addition to its Tioga plant, Philadelphia, for forging guns, will soon issue a list of further requirements, being in addition to orders which have been placed for about $300,000 worth of machine tools and several cranes, as mentioned last week. The Standard Steel Works Co., Philadelphia, has issued lists of machine tools it will buy for gun-forging work at its Burnham, Pa., plant.

Miscellaneous buying in this market continues at a good rate. The Autocar Co., Ardmore, Pa., is in the market and will complete purchases soon for about $200,000 worth of machine tools for additions to its motor truck plant. The North American Motors Co., Pottstown, Pa., now engaged in making truck motors, will make shells for the United States Government and will need considerable new equipment. The Budd Mfg. Co., Philadelphia, whose regular line is automobile bodies, will make pressed steel wheels for trucks, and will be in the market for the necessary machinery. The Wright Roller Bearing Co., Philadelphia, is buying some tools and inquiring for others for the equipment of a contemplaated large addition to its plant. The Nice Ball Bearing Co., Philadelphia, is building a new plant and has bought some of its equipment. Purchases are being made by J. L. McMichael, purchasing agent, Land Title Building. The Silvex Co. is buying for a new plant to be completed soon at Hellertown, Pa. The Keystone Motor Mfg. Co., East Greenville, Pa., has about completed an addition and is expecting a contract to make airplane engine parts. As soon as this contract is closed, new equipment will be bought. The Hero Mfg. Co., Philadelphia, which has a Government contract for gas masks has bought some machines, mostly for metal stamping

The Fort Mifflin Shipbuilding Co., Widener Building, has acquired a shipbuilding site of 178 acres at a point near the junction of the Delaware and Schuylkill rivers, and if certain expected contracts are closed, will proceed soon with the erection of a shipbuilding plant. Present plans are for six berths, but the land affords room for 16. The company expects to come into the market for cranes and shop machinery in about 30 days. L. H. Swind, president Swind Machinery Co., Widener Building, is a director of the concern. So far as can be learned no inquiries have appeared in this market for the new ship-assembling plant of the American International Corporation on Hog Island. It is expected that 50 or 100 cranes will be required in addition to plate-working machinery. Most of the steel for the ships will come to the yard already fabricated.

L. R. Duffield, superintendent of the machinery exhibition in the Bourse, Philadelphia, says that France is buying, or attempting to buy, millions of dollars' worth of steel and machinery in this country, and that orders are going begging because of inability of the American manufacturers to fill them at once. During the past 30 days, he says, inquiries have been received at offices in the Bourse for more than $1,000,000 worth of steel and machinery, half of which have come from France, and the remainder from South American countries, Sweden and Norway. Mr. Duffield predicts that France will come into this market for large quantities of industrial machinery and that after the war that nation will become a greater manufacturing country than ever before.

The Electric Service Supplies Co., Seventeenth and Cambria Streets, Philadelphia, manufacturer of electrical specialties, will erect a three-story addition, about 65 x 80 ft., at a cost of $21,000.

John Kearns, and associates, Philadelphia, have incorporated in Delaware the National Airoil Burner Co., with capital of $75,000, to manufacture oil burners.

The proposed new shipbuilding plant of the American International Corporation, 120 Broadway, New York, to be erected on Hog Island, near League Island, Philadelphia, will be used for the construction of steel vessels of about 7500 tons capacity for the Emergency Fleet Corporation. The works, it is said, will comprise fabricating shops, machine plant, riveting shops, etc., and will be one of the largest plants in this section devoted to Government shipbuilding. The company also operates the New York Shipbuilding Corporation, 120 Broadway, New York, with works at Camden and Gloucester City, N. J. At this latter location the company has commenced the construction of new shipways and auxiliary structures to provide for the immediate building of two battle cruisers for the Government.

The Auto Radiator Co., Philadelphia, manufacturer of automobiles and parts, will erect a two-story brick and stone addition, about 30 x 80 ft., at its plant on Vine Street.

The Allied Motor Truck Co., Philadelphia, has been incorporated with a capital of $25,000 to manufacture motor trucks. T. Frank Mullin is the principal incorporator.

The Jacob Gerhab Co., Philadelphia, has been incorporated with a capital of $167,000 to manufacture automobiles and parts. William Gerhab is the principal incorporator.

The Barrett Mfg. Co., Bermuda Street, Philadelphia, has commenced the erection of a new one-story addition, about 100 x 200 ft., to cost $50,000. W. M. Childs is president.

The American Ice Co., Sixth and Arch Streets, Philadelphia, is having preliminary plans prepared for its new two-story ice manufacturing plant to be erected at Tenth and Callowhill Streets, at a cost of about $250,000. A. N. Reuteschlin is engineer.

A. Schoenhut & Co., Adams Street, Philadelphia, manufacturers of toys, will build a new two-story plant at Venango and Amber Streets. Bids for erection are now being taken. Ballinger & Perrot, Seventeenth and Arch Streets, are the architects.

The Tacony Ordnance Corporation, Philadelphia, a subsidiary of the Tacony Steel Co., Milnor and Bleigh Streets, is taking bids for the erection of a two-story building, about 44 x 50 ft. It is said to be having plans prepared for a one and two-story shop building to cost about $450,000. Thomas B. Lippencott, Philadelphia, is architect.

The Chester Shipbuilding Co., Chester, Pa., will build a new two-story punch shop at its works at the foot of Kerlin Street.

The Bearings Co. of America, Manheim Pike, Lancaster, Pa., manufacturer of bearings, is having plans prepared for two one-story additions, about 38 x 80 ft., and 30 x 45 ft.

O. D. Harvard, Allentown, Pa., has closed negotiations with the local Chamber of Commerce for the establishment of a plant for the manufacture of meters and kindred recording apparatus.

The Bethlehem Motor Truck Corporation, Allentown, Pa., a Delaware corporation, has filed notice of change in its name to the J. M. Meek Corporation. The company has been building a new plant fronting on the Central Railroad of New Jersey for the manufacture of automobile trucks.

The Bowen Anchor Co., Morton, Pa., is taking bids for the erection of a foundry 90 x 200 ft., for steel casting work, pattern shop 25 x 70 ft., and office building 25 x 45 ft., estimated to cost about $75,000. The H. C. Eisenbise Co., Pennsylvania Building, Philadelphia, is engineer.

A two-story power plant will be erected at the new factory of the Ebert Furniture Co., Glen Rock, Pa.

The Bramcote Foundry & Machine Co., Pottstown, Pa., specializing in general foundry and machine work, is building extensions to its plant to increase the present capacity. A new machine shop will be constructed to be about 50 x 120 ft. An addition to the molding department is nearing completion, providing for over 7000 sq. ft. of additional floor space, while a new core room, 25 x 40 ft., equipped with core oven, is now ready for occupancy.

The Reading Chain Block Co., Reading, Pa., manufacturer of chain blocks and specializing in iron and steel castings, has commenced the erection of a two-story building about 25 x 150 ft., and a one-story building, 20 x 110 ft., to cost about $25,000. F. H. Howard is president.

The Gurney Electric Elevator Co., Main Street, Honesdale, Pa., manufacturer of elevators, hoists, etc., is now operating its plant under 24-hr. service at full capacity. An order has recently been received from the Government for 18 electric passenger elevators.

The Mount Holly Paper Mills, Mount Holly, Pa., will build a one-story addition to its machine shop, about 30 x 150 ft., to cost $10,000.

J. H. Choetham, 536 Penn Street, Reading, Pa., has awarded contracts for the erection of a new two-story machine shop at Carpenter and Cherry Streets, to cost about $5,000. Calvin J. Young, 520 Washington Street, is architect.

The Scranton Foundry & Engine Works, Scranton, Pa., manufacturer of marine engines, shafting, propellers, etc., is planning for extensions in its plant for increased capacity. The company, a New York corporation, has increased its capital from $100,000 to $700,000 and authorized an issue of $150,000 of preferred stock to provide for expansion. New York offices are at 5 Nassau Street.

The Valley Railways Co., Wormleysburg, Pa., has acquired property in the vicinity of Walnut Street, and is reported to be planning for the erection of new car repair shops and electric power station.

## Baltimore

BALTIMORE, Sept. 9.

Efforts are being made by Mayor James H. Preston and others to secure one of the big shipbuilding plants to be established by the Government. Officials have investigated several sites, but no definite decision has been reached.

The Cape Fear Shipyards Co., Wilmington, N. C., has been incorporated with $100,000 capital stock by Edward D. Langley, Frank Viola and Frank Armstrong, all of New York. It is understood property has been secured at Cape Fear and North East Rivers.

The Continental Automatic Sprinkler Co., Richmond, Va., has been incorporated with $300,000 capital stock. William E. Word is secretary.

Rich Brothers, 221 West Pratt Street, Baltimore, are in the market for a hack saw to cut up to ½ in. square bars and a press to punch stock up to ⅛ in. thick, for both soft and spring steel. The company also desires manufacturers' catalogs of drill presses, punching machines and power hack saws, both new and second hand.

The Baltimore Hub-Wheel Mfg. Co., Fallsway and Gay Streets, Baltimore, will make alterations and improvements in its plant to cost about $3,500.

The Valk & Murdock Co., Charleston, S. C., is planning for the construction of a new floating dry dock, about 100 x 440 ft., together with shop buildings to provide for additional capacity at its plant on the Cooper River. The dry dock will be designed to hold vessels of 8000 ton type.

The Hampton Roads Shipbuilding & Dry Dock Co., Norfolk, Va., recently incorporated with a capital of $1,000,000, is planning for the construction of a shipbuilding plant at West Norfolk, on a branch of the Elizabeth River. The proposed works will include shipways, machine shops, construction buildings and other plant structures. Gaylord W. Feaga is president of the company.

The Stopshock Wheel Co., Washington, D. C., has been

incorporated in Delaware with a capital of $500,000 to manufacture shock absorbing hubs for automobiles, wheels, etc. Walter S. Sergeant, Washington, is the principal incorporator.

The Pyrites Co., Ltd., Christiana Avenue, Wilmington, Del., is planning for the erection of a one-story addition to its works, about 35 x 50 ft., to cost $4,000.

The Wilmington & Philadelphia Traction Co., Wilmington, Del., is planning for the erection of an addition to its power plant at Eighteenth and Buena Vista Streets.

The Chesapeake & Ohio Railroad, Richmond, Va., is planning for the erection of new car and locomotive shops at its Russell, Ky., yards, estimated to cost about $1,000,000.

The American Chain Co. of Virginia, Norfolk, Va., has been incorporated with a capital of $1,000,000, as a subsidiary of the American Chain Co., Bridgeport, Conn. The company has acquired a site and will build a plant to cost about $250,000. Tazewell Taylor is president.

## Chicago

CHICAGO, Sept. 10.

The volume of business that is coming to dealers is satisfactory, despite the absence of new inquiries embracing large groups of machines such as have been common in the East. While a number of firms, most of which have been mentioned from time to time, have taken notable war orders, it is generally admitted that as a whole they look small in comparison with those placed in Eastern centers. Some companies which are making munitions for the United States will buy but little new equipment, as they possess all they need in the tools with which foreign orders were filled. If the West is to receive orders which would necessitate the purchase of large groups of small machines, buying has hardly started, this being the view of an authority in the trade. Of course, as heretofore reported, large orders have been placed for tractors, ordnance and gun mounts, and in a few cases for shells and fuse parts.

Heavy tools continue in the greatest demand, but second-hand stocks have been well cleaned up, and the deliveries on new machines are far off. Shipbuilding is largely responsible for the great call for punching and shearing machines, etc.

The Rock Island Arsenal has been a persistent buyer, and is distributing its orders in a way that gives something to most of the dealers. Considerable business has been placed in Chicago by Milwaukee interests, one of these being the Western Rope & Mfg. Co., 809 St. Paul Avenue, that city, formerly of Tulsa, Okla., which has bought machines for turning gas engine crankshafts.

The Edward Valve & Mfg. Co., East Chicago, will make a large number of valves and brass fittings for submarine-boat destroyers in addition to a Government order for fuse parts. The United States Ball Bearing Mfg. Co., Chicago, also is working on fuse parts.

The Canadian Car & Foundry Co. has bought a few machines for delivery to its plant at Jeffersonville, in southern Indiana.

In the last three months permits filed for new factories and additions in Chicago represent a value of $5,000,000. Of especial interest is the large number of small plants which have enlarged facilities. Included in the figures above are factories of various descriptions and some structures of a non-productive character, such as warehouses. New construction in general did not make a good showing in August, as the permits issued were less in number and estimated cost than in any month in 10 years. The August permits represented 374 buildings, involving a total estimated cost of $4,277,650, as compared with 758 buildings and $5,783,000 for the corresponding month a year ago, a decrease last month of 384 buildings and $1,505,350, or 26.03 per cent.

The George B. Lembert Co., 154th Street and Todd Avenue, East Chicago, Ind., has awarded the contract for a one-story pipe-bending shop and a one-story boiler house, to cost $11,000.

One of the machine shops of the McCormick Works, International Harvester Co., West Fourteenth Street and Western Avenue, Chicago, was damaged by fire Sept. 3 to the extent of $25,000.

The plant of the Chicago Drop Forge & Foundry Co., 116th Street and the Illinois Central Railroad, South Chicago, which has been idle for several months, has been purchased by Theodore Friedeberg, but no announcement has been made as to what use will be made of it. The plant embraces several one-story buildings.

William H. Pruyn, architect, 122 South Michigan Avenue, has taken bids on revised plans for the one and two-story factory, 100 x 600 ft., to be erected at Gary, Ind., for the International Airship Corporation, and it is expected that work will be started within 30 days. M. H. Cain, Gary Building, Gary, is secretary. The plant will cost $100,000, exclusive of three hangars.

The Charles W. Gindele Co., 3333 South La Salle Street, Chicago, has been awarded the general contract for a one-story shop, 157 x 203 ft., at 800 North Crawford Avenue, Austin, for the Chicago & Northwestern Railway, to cost $100,000.

The Swager Vaporizer Co., Saunemin, Ill., has been incorporated with a capital stock of $4,000 to manufacture a kerosene vaporizer for oil engines, the invention of Benjamin Swager. Mr. Swager, C. L. Tanner and C. R. Holdridge, all of Saunemin, are the incorporators.

The Weaver Mfg. Co., Springfield, Ill., will erect a one-story brick addition, 95 x 125 ft., which will be devoted to the manufacture of automobile specialties.

Plans have been revised for the four-story and basement factory to be erected for A. C. Ehman, president Ehman Tire & Rubber Co. and Vail Rubber Co., 142 West Twenty-seventh Street, Chicago. It will be of reinforced concrete construction, with metal trim and sprinkler system.

The Southern Illinois Machine & Foundry Co., Murphysboro, Ill., has had plans prepared for a new foundry and forge plant extension to cost about $35,000, exclusive of equipment. H. A. Bastien is secretary.

## Milwaukee

MILWAUKEE, Sept 10.

Business booked by machine-tool builders the past week is probably the largest in the history of the local industry. Shops are fairly swamped by the overwhelming rush of orders for Government contracts which began about 10 days ago. The demand is especially broad for milling machines and comes from a variety of sources, in which airplane builders in the East predominate. Makers of milling tools are so rushed with business that even the increased facilities provided the past year are wholly inadequate, and more extensions are being planned for immediate construction.

Pressure upon the tool industry is the strongest ever known, but distinctions are being drawn between buyers identified with the Government and private shops, although it would appear that practically every purchaser is executing Government contracts.

The labor situation is comparatively favorable. There is no surplus of skilled men, however, and it is difficult to procure an adequate supply of unskilled workers.

The Oneida Motor Truck Co., Green Bay, Wis., is taking bids through Foeller & Schober, architects, for the erection of its new one-story plant, of brick, steel and concrete, 125 x 475 ft., with a separate office building and transformer house, to cost about $150,000. L. P. Fortin is works manager.

The Wisconsin Gun Co., Milwaukee, is taking bids for the erection and equipment of a one-story transformer house 25 x 66 ft., for its new ordnance manufacturing plant at Thirty-fifth Avenue and Burnham Street.

The Racine Motor Truck Co., Racine, Wis., manufacturing motor trucks in leased quarters in that city, is negotiating for a site in Milwaukee for its proposed new manufacturing plant, to cost about $100,000. It will be equipped for the production of truck and tractor axles, transmissions and other parts. Ira L. Miller is president.

The Kempsmith Mfg. Co., Milwaukee, manufacturer of milling machines, has increased its capital stock from $300,000 to $350,000 to accommodate the rapid increase in business. Four months ago $100,000 was added to its capital. The plant has been doubled in size the past year, due to the enormous demand for milling machines. Paul E. Thomas is president and general manager.

The International Harvester Co. of America, Milwaukee, has awarded contracts for the construction and equipment of a new core building, 80 x 240 ft., estimated to cost $100,000, at 784 Park Street.

The Townsend Mfg. Co., Janesville, Wis., maker of gas and kerosene engines, farm tractors and other machinery, has plans for a machine-shop extension, 50 x 200 ft., which will enable it to double its output. The business was established three years ago and was incorporated in August with $125,000 capital. A production of 200 engines and 600 tractors is planned for the coming year. R. B. Townsend is president and general manager.

The Jorgenson Mfg. Co., Waupaca, Wis., recently incorporated with a capital stock of $75,000, is moving its machine-shop and works from Tustin, Wis., to Waupaca. It will specialize in the manufacture of automobile and gas engine specialties. P. J. Jorgenson is president and general manager.

The Gillette Rubber Co., Eau Claire, Wis., has increased its capital stock from $1,000,000 to $2,500,000. The company was incorporated in Maine and is building a tire and

rubber goods manufacturing plant at a cost of $200,000. H. B. Gillette is vice-president and secretary.

The Western Steel & Iron Co., DePere, Wis., manufacturer of steel barn equipment, agricultural tools, etc., is installing considerable new machinery and will make further purchases from time to time. The capacity of the plant is being increased about 35 per cent.

The Marvel Clutch Co., Milwaukee, has been incorporated with a capital stock of $25,000 by David Schwartz, Markus Tenner and Carl J. Nelson.

The New Way Machine Co., Eau Claire, Wis., recently incorporated with $60,000 capital stock, will take over the business of Wege Brothers, Minneapolis, Minn., manufacturers of a combination farm truck-tractor and concrete mixer. The works have been moved from Minneapolis to Eau Claire. The officers are: President, E. Wege; vice-president, J. Heintz; secretary-treasurer, Grant Haas.

The Hamilton-Beach Mfg. Co., Racine, Wis., manufacturer of electric appliances and devices, which erected a new plant within the last 18 months, is about to award contracts for the erection of a three-story reinforced concrete and brick addition, 80 x 150 ft., to cost about $80,000. Fred J. Osius is president and general manager.

The J. J. Vollrath Mfg. Co., Sheboygan, Wis., manufacturer of enameled sanitary ware and plumbers' goods, is erecting a foundry, which will be ready for operations before Oct. 1. The company has been building a new plant and the foundry will be the last unit to be moved from the old site at North Fifth Street and Huron Avenue.

## Detroit

DETROIT, Sept. 10.

The machine-tool market remains normal with no large orders placed the past week. Local automobile plants as a rule are well supplied with business. The manufacture of airplanes gives promise of becoming one of the leading industries of the city. Deliveries are improving on standard machines and, in general, machine-tool men are optimistic regarding fall prospects. Labor is in unusual demand and wages are high.

The Air-O-Flex Automobile Corporation, Penobscot Building, Detroit, has been organized to manufacture trucks with flexible suspension. John Ericson, Robert A. Weinhardt, Irving A. Cowles and others are interested in the enterprise.

The Lansing Forge Co., Lansing, Mich., incorporated with $100,000 by Eastern capital, has taken over the plant of the Emergency Drop Forge Co., which it will rebuild and operate on an enlarged scale. J. J. Callaghan, Detroit; E. M. Reifor, Pittsburgh, and Charles W. Nichols, a Lansing attorney, are the incorporators. Mr. Callaghan will be manager.

The Cook Car Journal Cooler Co., Flint, Mich., suffered a loss of several thousand dollars by fire, Sept. 1.

The Saginaw Shipbuilding Co., Saginaw, Mich., announces that its plants will be located on 20 acres of land with a 2000-ft. water frontage immediately north of Sixth Street. Plans and specifications have been completed and are ready for bids.

W. H. Kelly, formerly connected with the Bay City Body Co., and J. P. Friend are organizing a company in Bay City, Mich., for the manufacture of auto body covers. A portion of the Pioneer Boat Co.'s plant has been secured.

Plans are under way to bring to Grand Rapids, Mich., the E. R. Hayes Axle Co., Oshkosh, Wis., capitalized at about $500 000, which will mean a new industry in the automobile line. If plans go through, buildings will be erected on a five-acre site at a cost approximating $100,000, and the Grand Rapids Malleable Iron Co. will make extensions and increase its force to 200 men to take care of its relations with the axle company.

The Grand Rapids School Equipment Co., Grand Rapids, Mich., is assembling material for an order of 6400 motor truck bodies for the Government and will begin manufacturing in October. The first delivery will be in December and it is expected the production will be at the rate of 1000 a month.

The Grand Rapids Auto Products Co., Grand Rapids, Mich., has been organized with a capital of $10,000 to manufacture automobile parts. The stockholders are Harry C. Bennett, Robert J. Whyte, Christopher M. McCarthy and Arthur Post.

The Olds Motor Works, Lansing, Mich., has begun work on two new buildings, representing an investment of $400,000, to be completed by Jan. 1.

The Lapeer Truck Co., Lapeer, Mich., will erect a plant on an eight-acre site.

The plant of the American Magneto Co., Monroe, Mich., employing 200 men, will be moved to Toledo, Ohio, because of inability to get skilled help in Monroe. The company makes magnetos for automobiles, airplanes and gas engines. It has reincorporated in Ohio with a capital of $400,000.

The Tannewitz Works, Grand Rapids, Mich., maker of wood-working machinery, has purchased land adjoining its plant, and contemplates extensive additions. Carl E. Tannewitz is manager.

The Triangle Motor Truck Co., St. Johns, Mich., has awarded a contract for the erection of a one-story addition to its plant, about 70 x 235 ft., to cost $15,000.

## Cleveland

CLEVELAND, Sept. 10.

The machinery market is more quiet. Some orders have been placed for Government work, but considerable business, particularly for airplanes, is still being held up. Orders were placed the past week by the Inland Ordnance Co., Bedford, Ohio, for lathes, hammers, drilling and grinding machines and additional purchases will follow. Considerable business in turret lathes is coming out for the Government.

The feeling has developed among buyers that there may be some easing up in machine-tool prices before long, and many are deferring purchases of machinery that they do not need immediately. This is due doubtless to the proposed regulation of prices by the Government and the belief in some quarters that other consumers of iron and steel will secure lower prices and be able to reduce the price of their products. Machine tool builders and dealers, however, say that prospects of lower prices are very remote. Some small lot cancellations of machinery are reported, coming largely from automobile part and accessory manufacturers. Deliveries on plain and universal grinders have improved considerably and shipment on some lines of lathes is also better.

The National Lamp Works of the General Electric Co., Cleveland, will erect a new factory and warehouse, 145 x 266 ft., at 1131 East 152nd Street, at an estimated cost of $160,000.

The Economy Machine Co., Cleveland, has been incorporated with a capital stock of $25,000 by Abraham Gradis, David Krause and others.

The National Malleable Castings Co., Cleveland, has had plans prepared for a three-story pattern building, 61 x 150 ft., to be built in connection with its new malleable foundry.

It is reported that the Engel Aircraft Co., Cleveland, recently incorporated, will shortly exercise an option it has on the plant of the Niles Car & Mfg. Co., Niles, Ohio., and make extensive improvements and add considerable equipment.

The Trumbull Motor Truck & Wagon Co., Defiance, Ohio, has been incorporated with a capital stock of $1,000,000 to manufacture motor trucks and wagons. W. O. Allen, C. C. German, R. J. Holgatt and others are the incorporators.

The Burt Foundry Co., Toledo, Ohio, has been incorporated with a capital stock of $50,000 by Harold J. Kehoe, N. E. Hutchins and others.

The Akron Mold & Machine Co., Akron, Ohio, has commenced the erection of a new plant in Barberton, Ohio.

The Turnbull Motor Truck & Wagon Co., Defiance, Ohio, has been incorporated with a capital of $1,000,000 to manufacture motor trucks and will take over the Turnbull Wagon Co., Defiance. W. O. Allen, general manager of the Allen Motor Co., Fostoria, Ohio, is head of the company.

## Cincinnati

CINCINNATI, Sept. 11.

Rush orders are still coming from manufacturers having Government contracts. Large planers and lathes are in better demand than the smaller sizes. Airplane manufacturers are active buyers of small tools, including sensitive and portable electric drilling machines, etc. Engine makers are clamoring for equipment, but have not yet placed any large orders here. A Federal representative visited this section last week in an endeavor to place orders for gun mounts, but found all plants crowded with work, most of which is directly or indirectly for the Government.

The local labor situation is satisfactory, although more skilled mechanics could be used. The Niles Tool Works Co., Hamilton, Ohio, started up its foundry last week with a reduced force, but expects to have it in full operation within a few days. This foundry has been idle several weeks on account of a strike of molders for recognition of the union, which the company refused.

The W. T. Johnston Co., Cincinnati, is in the market for a gas-driven air compressor of 300, 400 or 500 cu. ft. capacity.

The Cincinnati Bickford Tool Co., Oakley-Cincinnati, will build a one-story addition to its plant, approximately 65 x

150 ft., of sawtooth roof construction. A. H. Teuchter is president.

The Worthington Pump & Machinery Corporation has awarded contract to Bert L. Baldwin, Cincinnati, for an addition to its plant at Elmwood Place, estimated to cost $100,000.

The Cincinnati Cornice Co., Cincinnati, is making an addition to its plant on West Court Street.

The Dayton Bronze Bearing Co., Dayton, Ohio, has acquired a site adjoining its plant on East Third Street on which it intends erecting an extensive addition at an early date.

The Advance Machine Co., Springfield, Ohio, will establish a plant on West Main Street for the manufacture of metal barrel plugs and other specialties. Grover Ilgen is general manager.

The Atcheson & Barok Die & Tool Co., Columbus, Ohio, recently organized, has equipped a shop for the manufacture of small tools and dies.

The Lieb & Allen Engineering Co., Columbus, Ohio, has been incorporated with $10,000 capital stock by Frank E. Allen and others.

The Royal Sand Co., Columbus, Ohio, recently organized, has opened an office in the Grand Theater Building, and will deal in foundry supplies. F. A. Downerd is president and H. L. Cabot vice-president and general manager.

The Columbus Steel Products Co., Columbus, Ohio, was recently incorporated to manufacture steel meter connections, unions, elbows and other steel specialties. Its plant will be located temporarily at Beech City, Ohio, but headquarters have been established at 43 West Long Street, Columbus. The officers are: President, S. A. Webb; vice-president, F. E. Sanborn; secretary and treasurer, O. H. Henry; sales manager, M. A. Corbett; superintendent of manufacture, H. B. Reading.

## St. Louis

ST. LOUIS, Sept. 10.

The demand in the machine-tool market continues for minor equipment. Insistence of deliveries of machines on order continues, but plants having Government contracts are accorded priority.

The Jonesboro Compress Co., Jonesboro, Ark., has been incorporated with a capital stock of $50,000 by J. E. Parr, E. C. Stuck and E. J. Mason and is receiving bids for power plant and compressing machinery.

The Gregory Drainage District, H. P. Foley secretary, Gregory Landing, Mo., is receiving bids for equipment for a drainage system, including two 42-in. centrifugal pumps, motors, engines, boilers, etc., for two 250-hp. units, one 10-ton traveling crane and other machinery.

The Manning Vaporizer Co., Fort Smith, Ark., has been organized with a capital of $50,000 by H. E. Manning, Sidney C. Reagan and others to manufacture a vaporizer for gasoline engines.

The Universal Heater Co., St. Louis, has been organized with a capital of $50,000 by J. G. Beckmann, C. R. Garrison and Francis B. Runder to manufacture water heaters.

Harry E. Alton, Enid, Okla., and others will equip an oil pipe line, expending about $50,000 for pumping equipment, etc.

The Kansas City Wholesale Oil Co., Kansas City, Mo., will establish an oil refinery and compounding plant at Oklahoma City, involving about $150,000 worth of machinery.

The Grand River Hydro-electric Co., H. C. Holderman, West Tulsa, Okla., manager, will equip a plant to develop 56,000 hp. H. C. Blackwell, Davenport, Iowa, is president.

The Solid Steel Scissors Co., Fort Smith, Ark., is in the market for machinery to increase its capacity.

The Missouri Quarries Co., Carthage, Mo., has been organized with a capital of $100,000 by J. B. Robertson, F. J. Lantz and others and is in the market for heavy quarry equipment.

J. P. Buchanan, Joplin, Mo., will equip a 400-ton concentrating plant at Picher, Okla., with electric motor power.

Miami, Okla., has approved an expenditure of $150,000 for waterworks and electric light plant equipment.

Sentinel, Okla., F. A. Mosher, mayor, is in the market for $7,000 worth of machinery for a waterworks, including fuel oil engine, etc.

S. J. Stewart, 312 Carondelet Street, New Orleans, La., will install foundry equipment.

The Mississippi Shipbuilding Co. is equipping its new plant at Mobile, Ala. Work will be started as soon as possible on several vessels of 2000 tons each.

The Turn Right Headlight Co., Harrison, Ark., has been incorporated with a capital of $100,000 to manufacture headlights for automobiles. George Henkle, A. R. Baker and J. C. Medley are the incorporators.

The Tennessee Land Co., Mobile, Ala., a subsidiary of the Tennessee Coal, Iron & Railroad Co., is planning for the construction of a new shipbuilding plant on the Mobile River. The proposed works will specialize in steel vessels, and will include shipways, shops and general construction buildings. George G. Crawford is president of the parent company.

## Indianapolis

INDIANAPOLIS, Sept. 10.

The Spring Steel Fence Co., Anderson, Ind., has been incorporated with $250,000 capital stock. The directors are Henry J. Wiethe, William A. Anglemyer, L. Bruce Sherwood, Bert Aldridge and John Lauch, Jr.

The Columbia Furniture Co., Rensselaer, Ind., has been incorporated with $20,000 capital stock to manufacture furniture. The directors are E. N. and A. M. Loy, Emil Besser, Solon G. Spiegel and S. O. Penrod.

The Stutz Motor Car Co., Indianapolis, has been dissolved and is succeeded by the Stutz Motor Car Co. of America, Inc., with capital stock of $1,125,000.

The plant of the Peerless Wire Co., Lafayette, Ind., was damaged by fire, Aug. 30, the loss being $50,000. About 100 men were employed.

## California

SAN FRANCISCO, Sept. 4.

The rapid advance in the price of silver has stimulated mining along the coast and inquiries are appearing for machinery. A revival of activity in the oil fields is reported. The big demand for shipbuilding and lumber machinery continues, small tools being particularly active.

The Moore & Scott Iron Works, Oakland, is having plans drawn for a fireproof machine shop.

The Basket Machinery Co., San Francisco, has been incorporated with a capital stock of $200,000 to manufacture basket-making machinery. The incorporators are F. B. Gibson, J. E. Laidlaw and Claude Daly.

The Hollywood Shipyard Co., Oakland, is asking for bids for the construction of four shipways and one long wharf at its shipbuilding plant.

The Nevada, California & Oregon Railroad Co. is erecting a machine shop and round house at Alturas.

The Southern Pacific Railroad Co. will replace its steam pumping plant at Casa Grande with a gasoline plant.

The Golden Gate Brass Mfg. Co., San Francisco, will equip a brass manufacturing and finishing plant.

The Los Angeles Standard Wood Steamship Co. has been incorporated at Phoenix, Ariz., with a capital stock of $200,000 by W. Bowring, J. C. Bond, J. F. Hubbard, L. Bowring and B. Porter.

The Standard Brass Casting Co., Oakland, has bought additional property on which it will build an extension.

The City Council, Oakland, has leased to the Union Construction Co. a shipbuilding site of 31 acres on the water front, to run for 25 years.

Bids are being taken by the Union Iron Works, San Francisco, for the construction of a machine shop to be erected at Alameda.

W. A. Boole, Martinez, has leased 30 acres of water front for a shipbuilding site.

The Pneumatic Loading Machine Co., San Francisco, has been incorporated with a capital stock of $25,000 by W. T. Scott, R. Bailey, M. H. Smith, J. Schlussel and J. D. Rutledge.

The H. C. Macaulay Foundry Co., Oakland, will erect an addition, 75 x 100 ft.

The Schaw-Batcher Co., which is to erect a shipbuilding plant in South San Francisco, announces that eight steel steamers of 8800 tons each will be constructed before Dec. 1, 1918. It will also install a plant for marine repair work.

John Nicholl, president Nicholl Terminal Co., Richmond, announces that the company will postpone its plans for the construction of docks and will install a plant to build both wooden and steel vessels. It has a site on the Richmond water front.

The Fageol Motor Car Co., Oakland, has applied for permission to reincorporate and increase its capital stock from $600,000 to $3,000,000. It will install a plant to manufacture motor cars, trucks and tractors.

The Pacific Coast Shipbuilding Co., Oakland, has been incorporated with a capital stock of $5,000,000 by Frank L. Hain, J. P. Lacey, Nellie Peters, K. C. Sullivan, C. E. Mulvany and E. M. Hanks.

The Hy-Pres Mfg. Co., Oakland, manufacturer of pumps, compressors and airplane engines, is having plans drawn for a plant at the foot of Eighty-second Avenue.

Benjamin F. Graham has leased six acres of tide lands at San Diego, on which he will erect a shipbuilding plant.

Improvements to be made to the La Playa Naval Station, San Diego, include marine ways, a machine shop and concrete coaling station.

## Texas

AUSTIN, Sept. 8.

The machinery and tool trades have benefited by the improvement in crop conditions. The demand for mining and other heavy machinery for shipment to Mexico shows a noticeable increase and large orders have been placed with companies in San Antonio, Houston, Dallas and El Paso. A heavy demand for small tools is also noted. It is stated that considerable machinery will be required in that country for the rehabilitation of industrial plants. Mexico formerly did a very large machinery business with Germany, which under present conditions is being diverted to the United States.

The Crown Oil & Refining Co., incorporated at Houston with a capital stock of $2,000,000, will build a refinery and operate extensively in the Gulf coast oil fields. R. L. Young of Houston is a stockholder.

The State Line Utilities Co., Texico, N. M., incorporated with a capital stock of $30,000, will build an electric light and power plant to supply that section with electrical energy.

The Marfa Electric Light & Ice Co., Marfa, has sold its electric light plant to Morrison & McCall, St. Louis, who will install additional machinery and greatly increase the capacity.

J. P. McDonough, head of the McDonough Iron Works, Galveston, is promoting the construction of a drydock at Galveston to cost about $500,000.

## The Pacific Northwest

SEATTLE, WASH., Sept. 4.

Capt. J. F. Blain, in charge of the local branch of the United States Shipping Board, will receive bids for the construction of wooden steamships or auxiliary power vessels, following advices from Washington that the Government will resume wooden ship construction. Practically all of the 10 wooden shipbuilding plants in Seattle are ready to submit proposals. The decision of the Shipping Board will also mean immediate resumption of work in several yards, construction of which has been held up on account of the indecision of the Government and the lumber situation.

Nothing definite has developed in the lumber situation. A few plants have agreed to the men's demands, but the majority are still idle or running with small forces. Sufficient lumber is being cut to supply Government needs, and spruce mills are busy on airplane products.

The Grant Smith-Porter-Guthrie Shipbuilding Co., Portland, Ore., will build a joiner shop and machine shop, each one-story, 40 x 80 ft., to its plant at St. Johns.

The Independent Foundry Co., Portland, has awarded contract for a crane runway at a cost of $2,500.

Ship construction has started at the Standifer Shipyards in Vancouver, Wash., which has Government contracts for six vessels, to be equipped with boilers, engines and auxiliary gear in the plant. Ships built at the company's yards in North Portland will be taken to the Vancouver plant for completion.

The Aberdeen Shipyards, Aberdeen, Wash., plans extensive improvements during the fall and early winter. Several slips will be added.

The Howd Turbine Co., Nampa, Idaho, has been formed with capital stock of $5,000,000 to manufacture rotary engines, convertible car attachments, etc., and plans to establish a factory.

The Allen Shipbuilding Co., Seattle, recently incorporated by C. J. Smith and Frank P. Allen, has started work on the construction of its wooden shipbuilding plant.

The Foundation Co. of New York has acquired a 50-acre site on the tide flats, Tacoma, Wash., where a shipyard with 10 or 12 ways will be built.

Construction will be started at once on the new plant of the Wilson Shipbuilding Co., Seattle. Three ship ways and a sawmill plant will constitute the first unit, to cost $15,000.

The plant of the National Engineering Co., Seattle, under construction at a cost of $100,000, is nearing completion. It will manufacture hydraulic rams, air compressors, boilers, fuel oil and water tanks, and conduct a general machine shop. A number of contracts have been booked. C. R. Briggs is president.

The Marine Pipe & Machine Works, Seattle, is establishing a new plant, 100 x 180 ft., for the manufacture of the Sumner heavy duty marine oil engine. Traveling cranes of 15 tons capacity and other equipment will be installed and six engines will be erected at one time. All of the material and crank shafts, forgings, etc., will be manufactured in Seattle. The company has under construction in its old plant two four-cylinder Sumner engines of 400 hp. each and costing $60,000 for the Olympia Shipbuilding Co.

Equipment, including boiler and engine, generator, motor, pump, etc., in the auxiliary steam plant of the Coast Utilities Co., Arlington, Wash., was recently destroyed by fire. The plant will be rebuilt.

## Canada

TORONTO, ONT., Sept. 10.

The Liberty Motor Car Co. of Canada, Ltd., Windsor, Ont., has been incorporated with a capital stock of $10,000 by Percy Owen, James F. Bourquin and Harland M. Wirth, all of Detroit, to manufacture motor cars, vehicles, accessories, etc.

The Mutual Motors, Ltd., Hamilton, Ont., has been incorporated with a capital stock of $25,000 by James M. McGill, Harry E. Phillips, William F. Roney and others to manufacture automobiles, motors, etc.

The Collingwood Steamship Co., Ltd., Collingwood, Ont., has been incorporated with a capital stock of $40,000 by George C. Coles, Frederick G. Moles, Michael P. Byrnes and others to manufacture boats, from wood and steel, boilers, engines, etc.

The Whalen Pulp & Paper Co., Victoria, B. C., which is engaged in establishing a large paper manufacturing plant on Vancouver Island, at the new town of Port Alice, near the head of the southeastern arm of Quatsino Sound, will lay two keels at a time and will continue building ships, until it has enough to handle its export trade.

Contracts for the plant to be erected at Midland, Ont., for the McDougall-Smith Shipbuilding Co., in which Capt. Alexander McDougall is interested, consist of a carpenter shop, 50 x 200 ft., two stories; two one-story workshops, each 32 x 300 ft.; two-story office building, 50 x 65 ft., and a boiler and oil house. It is the intention to have the plant ready by late fall.

The Dominion Wheel & Foundries, 131 Eastern Avenue, Toronto, has had plans prepared for the erection of a machine shop to cost $5,000. Construction will start immediately.

The Canadian Vickers, Ltd., shipbuilder, 3072 Notre Dame Street, East, Montreal, has awarded contract, for the erection of a concrete factory to cost $48,000.

David Eidt, Mildmay, Ont., is in the market for a steel or iron bulkhead for a 42-in. waterwheel and inserted tooth circular saw, from 52 to 60 in. in diameter.

The Hamilton Lumber & Coal Co., Ltd., Hamilton, Ont., is in the market for a four-sided molder and sticker, joiner, cut-off saw, etc.

## NEW TRADE PUBLICATIONS

**Drop Forged Tools.**—J. H. Williams & Co., 57 Richards Street, Brooklyn, N. Y. Russian catalog. Describes and illustrates an extensive line of drop forged tools, including wrenches of all types, lathe and planing machine tool holders, limit gages, clamps, lathe dogs, eye bolts, hooks, pipe wrenches, etc. The catalog is arranged practically the same as the English edition with an illustration of a tool at the top of the page, followed by a brief description and tables of the various sizes that can be supplied.

**Pneumatic Tools and Electric Drills.**—Independent Pneumatic Tool Co., Thor Building, Chicago. Circular Z. Concerned with a line of pneumatic hammers and pneumatic and electric drills. The various types of drills are shown, as well as the pneumatic hammers which are made with inside and outside triggers for chipping, calking, light riveting, scaling, cleaning and flue beading. Condensed specification tables of the different tools are included.

**Grinding Wheels.**—Carborundum Co., Niagara Falls, N. Y. Catalog No. 6. Covers a line of Carborundum and Aloxite wheels for all classes of grinding and other products of the company used in the metal-working trades. After

brief descriptions of the manufacture and characteristics of the two abrasives, the manufacture of the wheels is gone into at some length. Instructions for testing and mounting grinding wheels are given, together with a number of tables of useful information. Recommendations as to the various grades of wheels to be used for different kinds of work are presented, followed by drawings of the various shaped wheels that can be supplied and instructions for their use on different classes of work. A telegraph code and alphabetical and numerical indexes are included.

**Gear Hobbing Machine and Lathe.**—Himoff Machine Co., Astoria, N. Y. Two circulars. The first relates to a line of gear hobbing machinery which is built in two sizes for handling work up to maximum diameters of 8 and 24 in. respectively. The construction of both sizes is gone into at some length, and illustrations and condensed specification tables of the two machines are included. The other circular deals with a 12-in. engine lathe for thread cutting. The construction is gone into in some detail, the text description being supplemented by numerous engravings of the various parts. A general table of dimensions, weights, etc., is included.

**Telephones for Interior Use.**— Connecticut Telephone & Electric Co., Meriden, Conn. Catalog No. 25. Gives illustrations and brief descriptions of an extensive line of telephones, annunciators and electrical specialties. The telephones include intercommunicating and switchboard equipment of all kinds. Wiring diagrams of the various systems are included with brief descriptions of the uses to which they may be put and the types of telephones that can be employed. An index of systems is included, together with an alphabetical index of the contents and a numerical index of list numbers.

**Gear Planing Machines.**—Gleason Works, Rochester, N. Y. Catalog. Treats of a line of gear planing machines which operate on the generating principle to produce bevel gears and pinions. The machines are automatic in operation and the various types are illustrated and described. The advantages of accuracy and adaptability for various kinds of work are briefly touched upon. Mention is made of a grinding machine for the tools employed and machines for hardening and testing the gears. Line drawings of a number of parts are included.

**Graphic Meter.**—Esterline Co., Indianapolis. Circular. Shows what is claimed to be the largest graphic meter in the world, a 250,000-kw. instrument installed at the Keokuk plant of the Mississippi Power Co. A description of the meter, which is of the induction type and employs 30 polyphase meter elements, each made up of two single-phase units, is gone into at some length.

**Automatic Motor Starter.**—Electric Controler & Mfg. Co., Cleveland. Bulletin No. 1042. Contains a brief description of an automatic compensator for starting squirrel cage induction motors and a brief discussion of its advantages. Among the latter are rapidity, safety, lessened power consumption and a reduction in the amount of floor space required. The design of the compensator is gone into at some length and the text is supplemented by views of the compensator and the master switch with the push buttons for starting and stopping the motor.

**Sandblast Machines.**—Hoevel Mfg. Corporation, 50 Church Street, New York. Catalog F-1917. Describes and illustrates a line of dustless, automatic, self-contained sandblast machines. The advantages of using the sandblast for cleaning castings and forgings are briefly touched upon and a short general description of the construction of the machines is given. This is followed by illustrations of the different ones, which include the stationary nozzle, revolving barrel and rotary and sprocket table types. In connection with the illustrations of the machines descriptions of the construction and statements of the particular work for which they are adapted are included.

**Bolts and Nuts.**—Samuel Hall's Sons, 229 West Tenth Street, New York. Catalog. Calls attention to an extensive line of screw and tap bolts, nuts, washers; lag, cap and set screws; bolt ends, turnbuckles and milled goods of every description. There is practically no text in the catalog, illustrations of the various products supplemented by size tables where necessary being relied upon to tell the story.

**Oxy-Acetylene Apparatus.**—Imperial Brass Mfg. Co., 1200 West Harrison Street, Chicago. Catalog No. 140. Shows the various oxy-acetylene cutting and welding outfits and the torches, regulators and accessories used in connection therewith. A brief description of the process for welding and cutting is presented, followed by a discussion of its application to various industries and a general description of the equipment furnished. This is followed by detailed descriptions of the several outfits, the text being supplemented in practically every case by illustrations and specification tables. A number of views of typical operations performed by the equipment are included.

**Grinding and Polishing Machinery.**—Webster & Perks Tool Co., Springfield, Ohio. Loose-leaf catalog. Illustrates and describes a complete line of grinding and polishing machinery and accessories. The machines include plain and ball bearing and direct-connected motor-driven types. In almost every case a separate page is devoted to a machine or accessory with an illustration at the top, a brief description and a condensed table of specifications.

**Grab Bucket.**—Blaw-Knox Co., Pittsburgh. Circular. Describes the Blaw Bulldog bucket used for handling ore and other materials from steamers to docks and from docks to cars for shipment. The construction of the bucket is gone into at some length, emphasis being laid upon the character of the material used. A condensed specification table for the buckets, which are built in sizes ranging from 1 to 4 cu. yd., is included.

**Steels.**—Peter A. Frasse & Co., Inc., 417 Canal Street, New York. Catalog. Pertains to a line of electric and open-hearth steels for a variety of purposes. The catalog is divided into sections, each of which is devoted to some one kind of steel. In these sections the different grades are briefly described with lists of the uses to which they may be put and instructions for welding, forging, annealing and hardening. Complete instructions on cold finishing and heat treating steels are presented and mention is made of a line of screw steel, shafting and tubing. Tables of the various sizes that can be supplied are included.

**Coal Briquetting Machine.**—Excelsior Tool & Machine Co., East St. Louis, Ill. Circular No. 58. Calls attention to a machine for briquetting all kinds of coal, lignite or coke. The construction of the machine is gone into at some length and emphasis is laid upon the output, which is 150 tons of briquettes in a 10-hr. day. Illustrations and a condensed specification table are included.

**Drilling and Boring Machine.**—Medina Machine Co., Medina, Ohio. Circular. Calls attention to a high duty drilling and boring machine which was illustrated in THE IRON AGE, March 29, 1917. A general description of the machine is presented, supplemented by an illustration and condensed table of specifications. The description is in the form of a series of short paragraphs with the first few words capitalized to indicate the subject covered.

**Air Washers.**—Carrier Air Conditioning Co., Buffalo. Folder. Lists the advantages of an air washer for schools, office buildings and factories. The folder is intended to represent the exterior of the washer when closed and by opening it out the appearance of the interior and its construction are shown. The advantages of the washer are set in type on the parts which fold over.

**Blowers and Injectors.**—Eynon-Evans Mfg. Co., Fifteenth and Clearfield streets, Philadelphia. Catalogs Nos. 15 and 16. The first relates to a line of injectors, syphons and water heaters. Illustrations of the different types are presented with brief descriptions in some cases and condensed tables of dimensions and specifications in every instance. The other catalog is concerned with a line of blowers for furnishing draft for boilers and gas producers. A description of the apparatus, which is of the steam jet type, is first presented followed by illustrations and specification tables of the various sizes. A discussion of the advantages of the blower for use with gas producers is presented and the text is supplemented by a number of test curves and views of installations.

**Lamp Hanger.**—Thompson Electric Co., 5606 Euclid Avenue, Cleveland. Supplement B to catalog B-16. Concerned with a disconnecting hanger for use with overhead incandescent lamps. The advantages claimed for the hanger are that the man is protected from shock while cleaning the lamp or reflector or making repairs as the lowering of the lamp disconnects it from the supply circuit and as the rope is inclosed, the lamp is protected from molestation in exposed places and is secured in place by a ring on the lower end of the hoisting rope which is locked.

**Induction Motor.**—Crocker-Wheeler Co., Ampere, N. J. Bulletin No. 180, superseding No. 160. Relates to a squirrel cage induction motor for constant speed operation on polyphase circuits. The mechanical construction and the electrical features are briefly touched upon followed by a description, more or less in detail, of the various parts. Views of the motor assembled and separated into its component parts are presented.

**Turret Lathes.**—Gisholt Machine Co., Madison, Wis. Circular. Calls attention to the rapidity with which the machining of circular or cylindrical chuck work such as castings, forgings, bar stock, etc., can be performed on the company's turret lathe. A number of views of parts made on the lathe are presented, the time in which they were made being emphasized. Several illustrations of the lathe equipped with various standard tool arrangements are included. Mention is made of a grinding machine for sharpening the tools used.